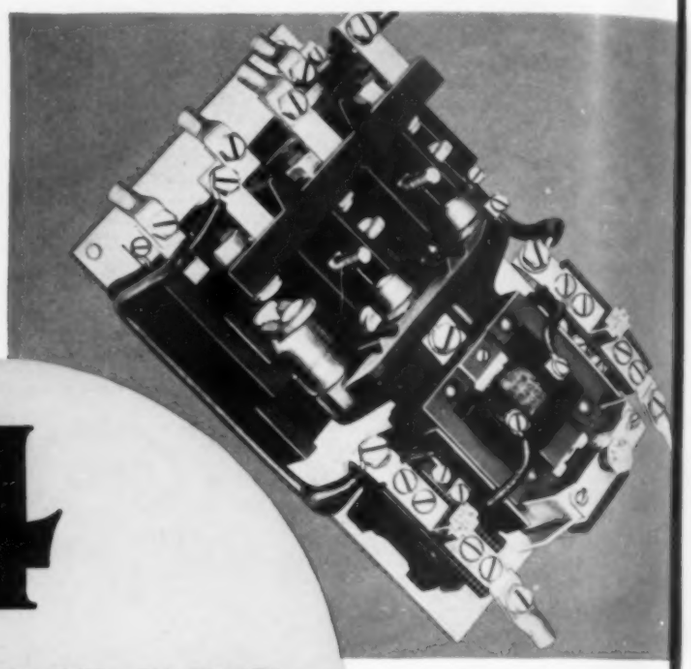
MODERN PLASTICS

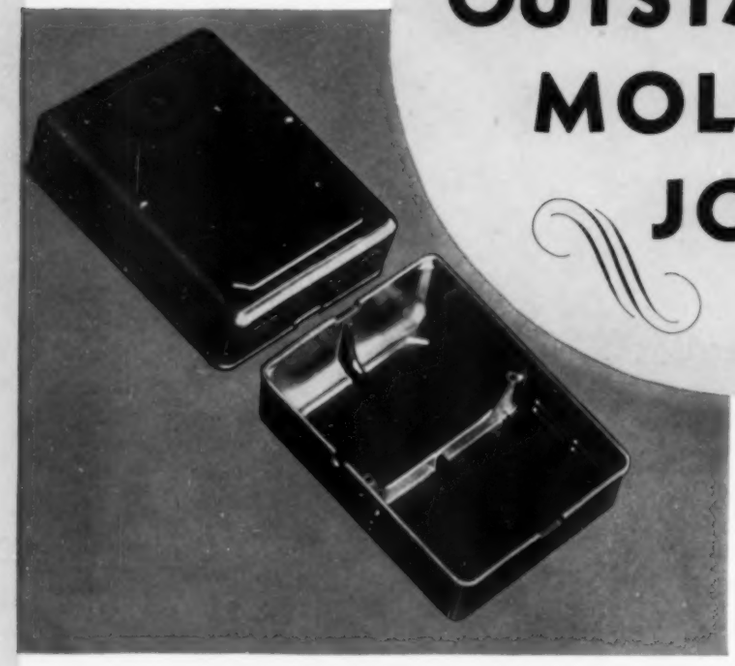
DECEMBER 1934

This foot control unit on the Davis Bovie Diathermy machine requires a material that can take the toughest kind of punishment . . . so they selected Durez. It will keep that clean, neat appearance for years in spite of the fact that it is constantly being kicked and stepped on. Why? Because Durez won't chip, peel, or crack . . . the surface finish is the material itself.

This switch base is an intricate bit of molding . . . well-done with Durez. Lugs, bushings, threads and inserts are molded into the piece in one operation . . . a saving in assembly costs. Because of the high dielectric strength of Durez, no other insulation of the base is needed. What other material provides insulation, structural strength and ease of production?



4 OUTSTANDING MOLDING JOBS



This bell box, when made of metal, required nine production operations . . . blanking, forming, trimming, grinding, sandblasting, phosphate finishing, scratch brushing, japanning and baking. By the use of plastics, the finished product is now turned out in three operations . . . molding, removing fins and buffing. The elimination of six operations resulted in a substantial saving in production cost, and produced a better product. The smooth lustrous Durez finish is permanent.

First of its kind, is this molded Durez valve which controls the flow of water in modern toilet. Materials used in past were effected by chemicals found in the water in many localities. But Durez is unaffected by water, alcohol and most common chemicals, and will not corrode or break down even when constantly submerged in them. Such chemical inertness and resistance to moisture make Durez and ideal material for water meter parts, film developing trays, pump and washing-machine parts, etc.

For detailed information on Durez molding compounds write General Plastics, Inc., 265 Walck Road, North Tonawanda, N. Y.

DUREZ *THE MODERN MOLDING COMPOUND*

VOLUME TWELVE NUMBER FOUR

DECEMBER 1934

MODERN PLASTICS

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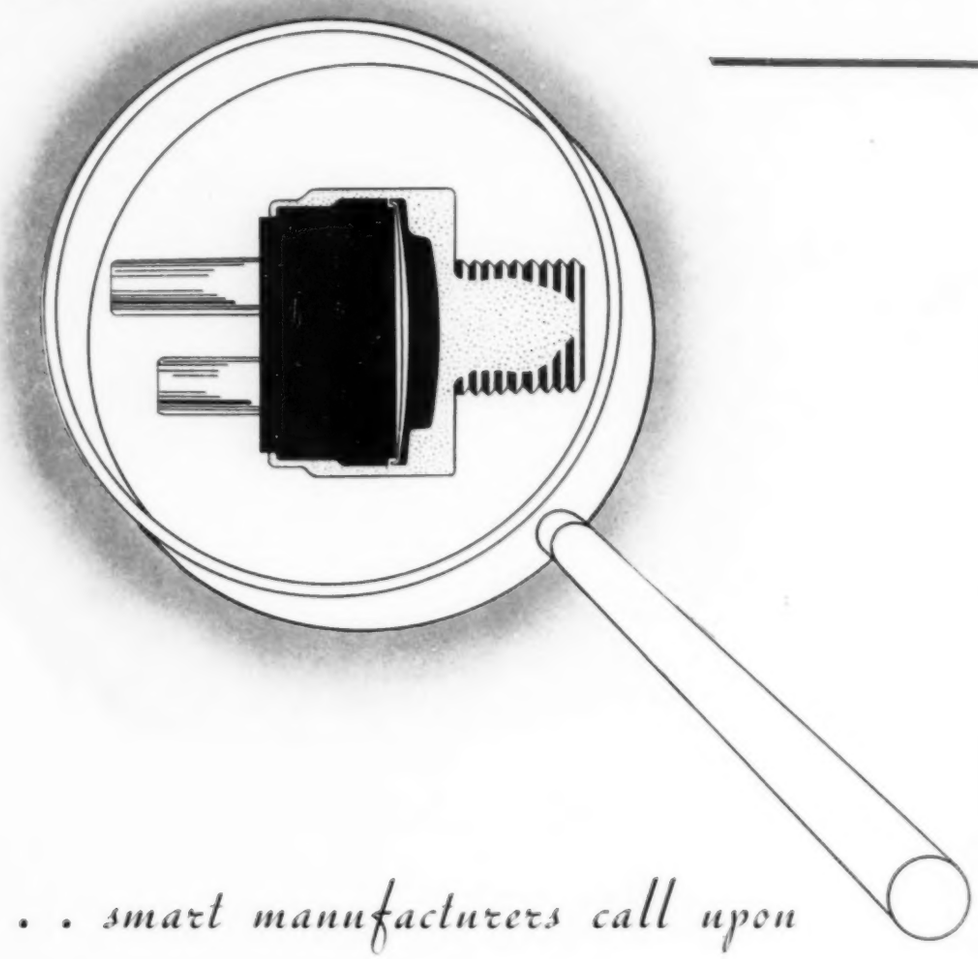
When life depends on a TINY MOLDED PART . . . .



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MODERN PLASTICS

BRESKIN AND CHARLTON PUBLISHING CORP.
DECEMBER, 1934 VOL. 12, NO. 4

THE ARCHITECT DESIGNS HIS OWN HOUSE...

...And Laminated Plastics Play the Dominant Role

by E. L. Fredricks

THE modern home which Morris B. Sanders, Jr., is planning to build at 219 East Forty-ninth Street, New York, will reveal some practical uses of plastics as well as exemplify many of the architect's personal ideas of modern construction.

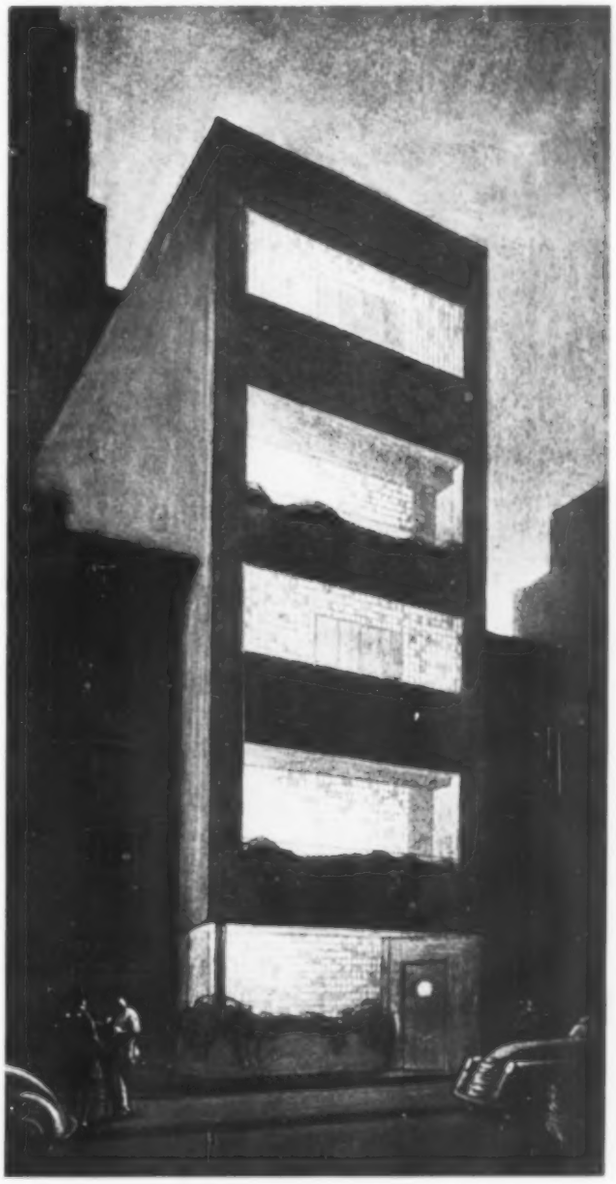
There will be a studio on the ground floor and two duplex apartments above. Mr. Sanders will occupy the studio and the top duplex which consists of a huge living room and dining room, separated only by flexible screens which may be rolled up and tucked away on occasion, two master bedrooms with baths, kitchen and maid's room with bath. There is a fireplace planned for each floor at the front.

It must be fun for an architect to plan and build a home for his own use. Ideas may romp and play with no restraining hand of a client to bash them against a wall of whims nor trip them with opinions that reflect his personal prejudices.

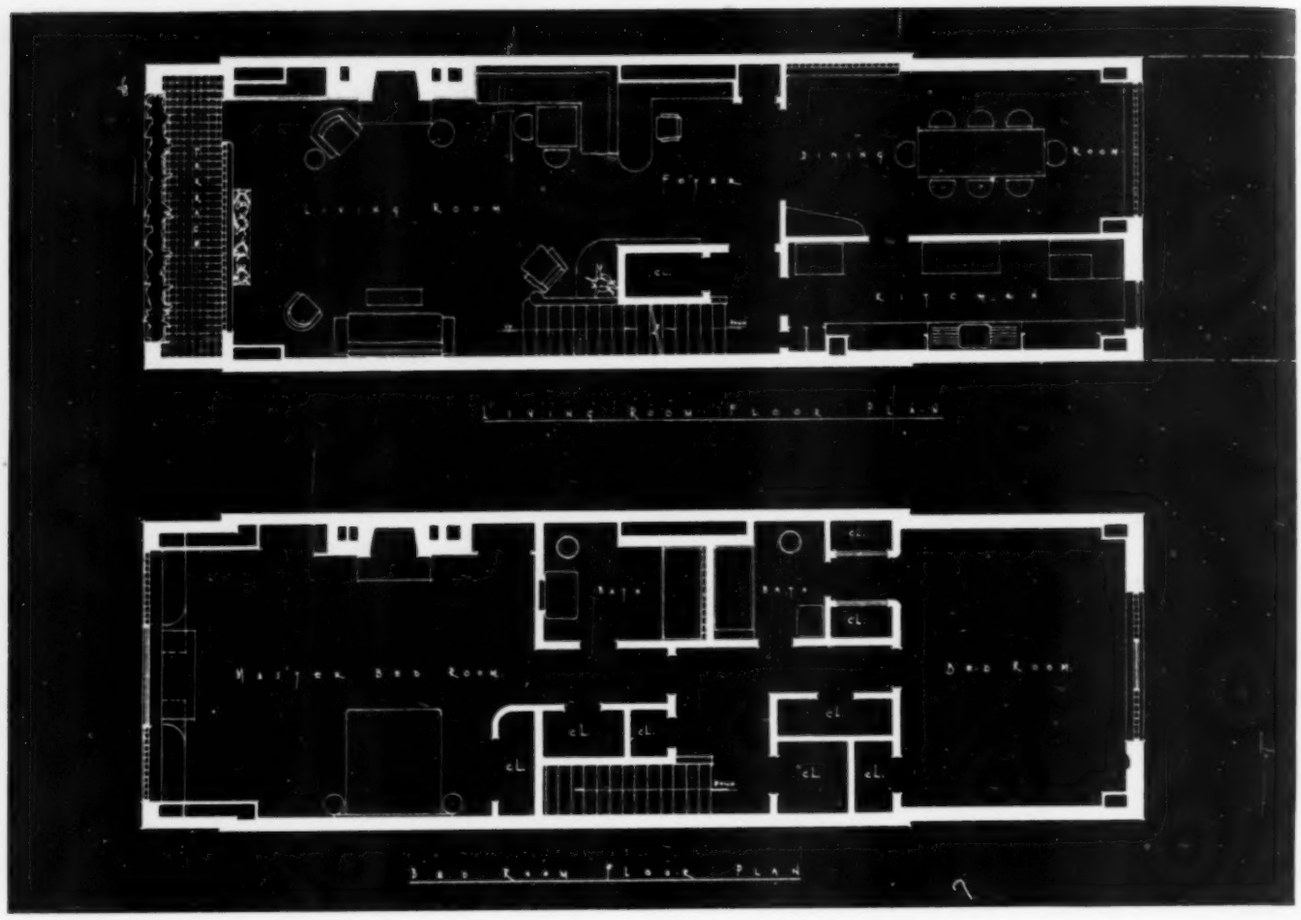
I asked Mr. Sanders about this and he assures me it is much more difficult to keep his ideas within reason than it would be if he were building the house for a client, and the worries are infinitely more intense.

"An architect's knowledge of materials and what to do with them," he says, "so far exceeds his purchasing power usually that decisions are made doubly difficult."

One thing is certain, however, he will make good use of his knowledge of molded plastics gained through experience and they will be used freely enough to excite the interest of every one engaged in this rapidly growing industry. Some of the uses may not be new, but the fact that an architect, spending his own money on his own home, prefers them to other available materials is convincing evidence of their value in modern construction and suggests the potential future of



Night elevation of the five-story house of Morris B. Sanders. The house will be a duplex, containing two five-room apartments



Floor plan of Mr. Sanders' duplex apartment indicating general arrangement of furnishings as planned

plastics as their value gains greater general acceptance and appreciation.

Propped comfortably on a couch in his penthouse the other evening after dinner, Mr. Sanders spread the blue prints of his new home across his lap and discussed some of his general plans.

"It is a bit early," he began, "to tell you just where I intend to use plastics because the interiors have not been completely developed, but I have a general idea of where they will be employed providing their cost will permit.

"I'm not spending a fortune on this house," he continued, "but I am building it for permanence and intend to incorporate every convenience for restful and gracious living."

Then he went on to explain that much of the furniture in his own duplex apartment will be an integral part of the room construction, thus giving expression to his appreciation of simple surfaces without design.

He plans to make use of the plain dull surface of veneered plastics to bring out the relationship of color and space in the various rooms, and to give proper proportions to the plastic doors which in themselves can be made to form lovely designs if well handled.

The fireplace wall will have a mottled phenol laminated veneered facing with built-in cupboards, while the fireplace itself will relieve this space with a dark marble facing, affording an advantageous contrast.

The main stairway, as well as private stairways to the chamber floors, will have plastic hand rails, and horizontal strips of veneered plastics will be studded onto occasional wood uprights the length of the stairways much the same as boards are fastened to a country fence. Seats and bookshelves in the living room will be placed permanently and the front of one such seat will form the back of a desk which will have a plastic base.

Near the window, a long low plant table about a foot high will have a dull finish plastic top which cannot be harmed by exposure to the sun or by water spilled from the plants. Its permanent finish makes phenol the ideal material for such use, according to Mr. Sanders. A card table with white plastic top inlaid with black and aluminum squares for chess will find much use since Mr. and Mrs. Sanders are both addicts to the game.

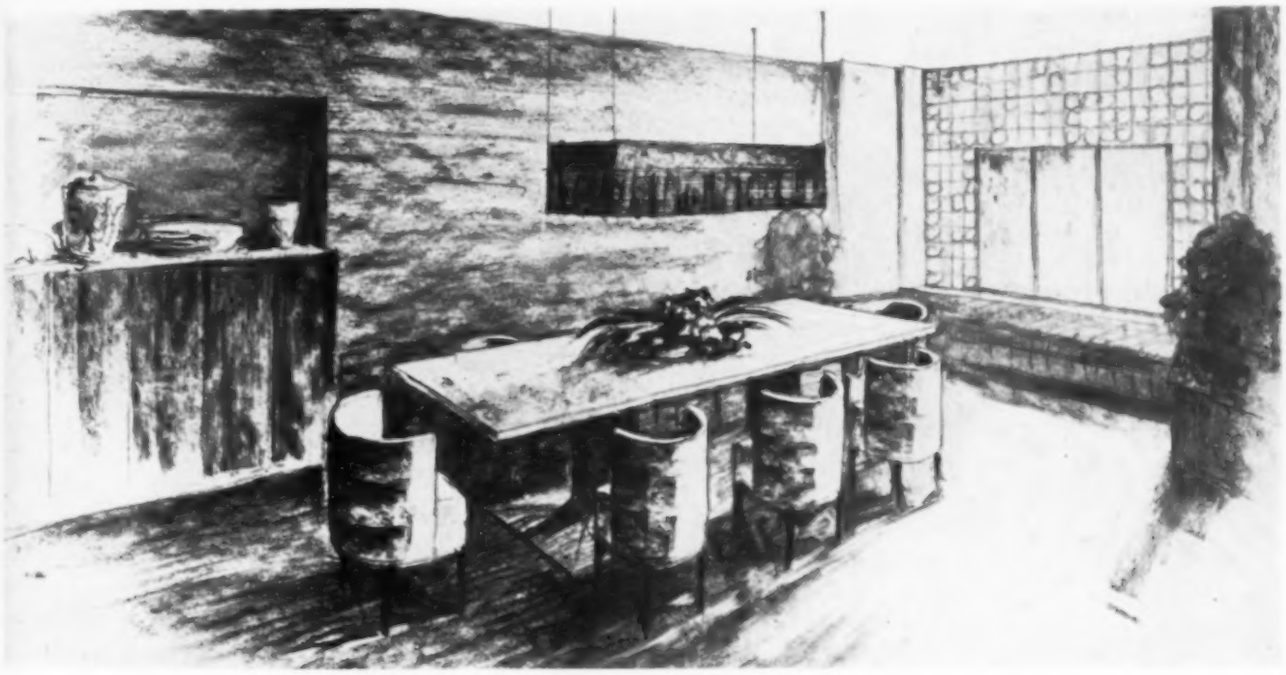
The refectory table, with plastic top and stainless steel base, will be fixed permanently to the floor of the dining room, and a sideboard with plastic top will be built beneath the window. A serving table of unique shape near the pantry door will have a slab of glass or plastic for its top, and wood for its base and moldings.

The use of plastics in the dining room removes all worries over hot dishes, spilled drinks and cigarette

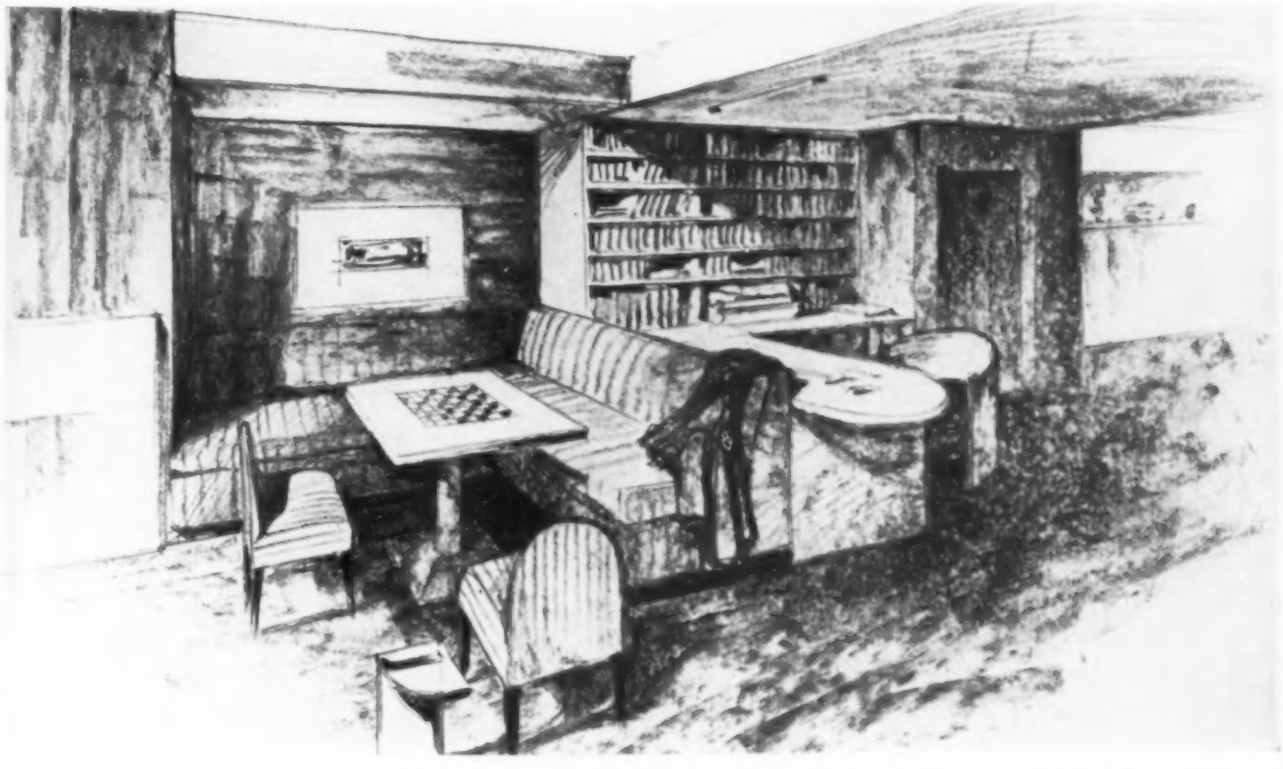
burns, and permits the dining table to be used with informal settings and no danger of its being damaged by a careless guest.

Mr. Sanders recalled a house he did some years ago where finest foreign wood veneers were used in pleasing combination. They soon became a constant source of worry to the owners. Each time a guest laid down a cigarette it had to be carefully watched, and even with this precaution the woods soon became soiled and burned beyond repair and it was impossible to replace them without tremendous expense.

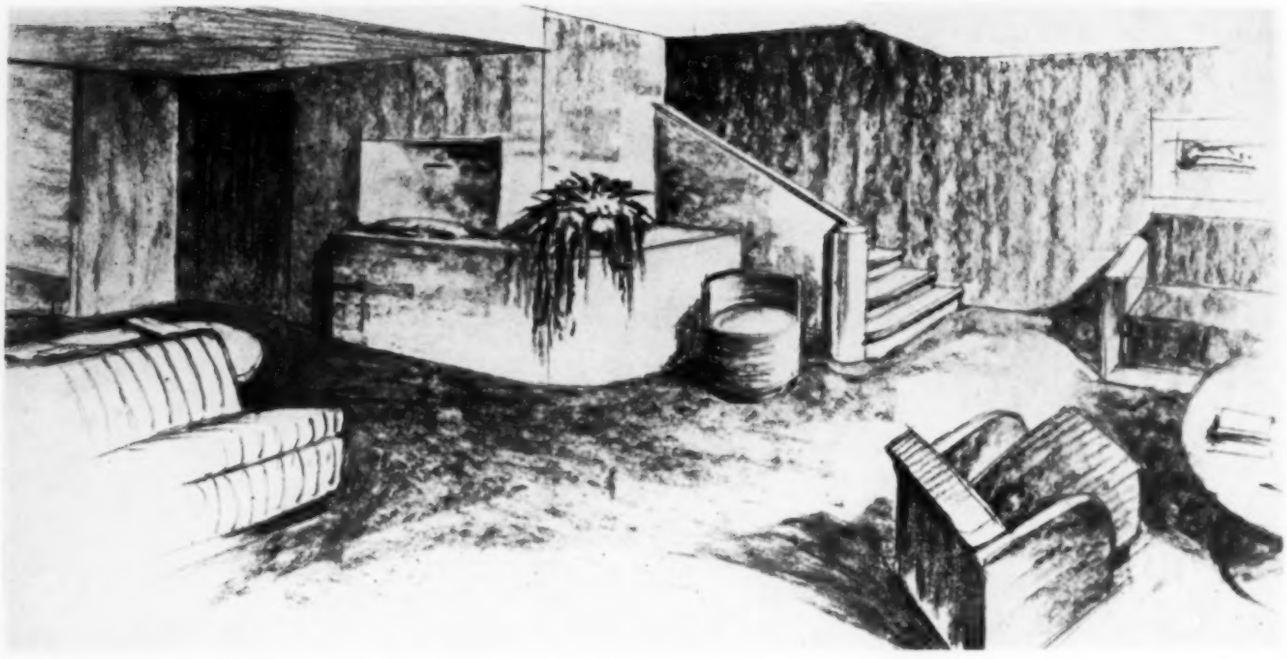
Even the most expensive burl job, or Macassar ebony, must be refinished after a few years to remove "checking," and frequently the veneer has to be re-



Dining room sketch showing built-in trestle table with plastic top on stainless steel legs and sideboard with plastic slab



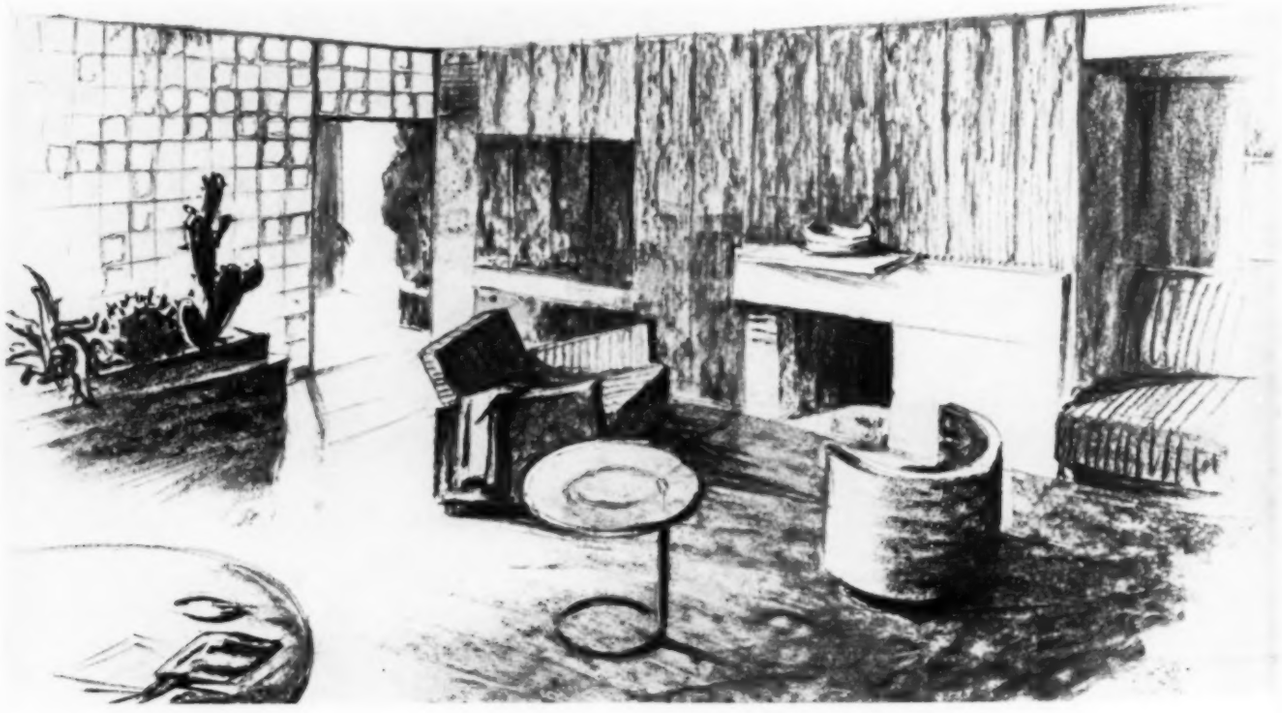
Intimate grouping for gracious living in which veneered plastics form the decorative motif of chess table, desk and flush panel door. Note the practical utility of the material in this setting



Living room bulkhead with plastic top and stair to chamber floor with plastic hand-rail. Veneered plastic panels case the stair horizontally and are studded to wood uprights which are invisible

placed. Plastics, if they are put on right in the beginning, are absolutely permanent, according to Mr. Sanders, and will last forever. "Plastics may cost a bit more for some purposes," he says, "but I would rather pay it then have the jitters every time we serve drinks, or lay down a cigarette."

Plastic veneers will be used for occasional trim in bookcases and closets and the minor chamber will have sliding doors of plastics with metal hardware. In fact, it is Mr. Sander's present plan to have all doors in the house set flush and veneered with plastics to assure their permanent finish and to lend a design motif to plain walls. While mottled browns will be used in many places, he plans (*Continued on page 62*)



Veneered plastic wall of natural mottle forms a delightful background for the marble fireplace, and the long low plant table near the window is also of phenol material

PLASTICS WIN CONTRACTS FOR PIONEER TELEPHONE MANUFACTURER

THE AUTOMATIC ELECTRIC SALES COMPANY has been making telephone equipment for over forty-three years. Equipment of its manufacture plays a part in the operation of over seventy-five per cent of the world's automatic telephones. Through its subsidiary and associated companies, it engages in the manufacture, the installation and the operation of telephone systems on a world-wide basis. It makes and installs intra-office systems, prison systems, portable phones, private automatic exchanges (the well-known P-A-X) for use in offices, schools and other institutions, as well as numerous other types of telephonic communication equipment for every conceivable requirement. Within the confines of a single organization we thus have an opportunity to study the comparative advantages of various materials both in manufacture and in use, both from the viewpoint of utility and that of cost.

How then does this giant company look upon molded plastics?

First and most important indication is the fact that Automatic Electric maintains its own molding plant. Its reason for so doing is a dual one; first, because of the large volume of its work and the comparative freedom from seasonal variation which it enjoys and, secondly, because, with its own plant, it is able to produce, economically, development work that might otherwise prove expensive and might disclose the secrets of inventions yet unpatented.

In maintaining its own plant, the company is, of course, unusual. It does so because the conditions under which it operates are themselves unusual.

Many firms having a molding volume as large or larger find it economical to utilize the facilities of custom molders because of a differing set-up of molding, time and planning requirements.

From this molding plant have come innumerable parts, from the automatic switching equipment of the large exchanges down to little molded switch buttons for two-way private phones. Three developments in particular are of decided interest, illustrating, as they do, the progress of design and the parallel progress of molded phenol-resins.

First, the Desk-type P-A-X Monophone, a device which has passed through several design-development stages over a period of years. Originally made as a mere adaptation of the old-fashioned standard type telephone, it was first re-designed as a so-called French phone of conventional appearance, but differing from those in common use in this country in that the entire instrument housing, stand, cradle, handle, mouthpiece and earpiece were molded of black phenol-resin. Molding facilitated manufacture and provided a more convenient instrument to use, particularly in so far as it eliminated the cold metallic touch so common to other phones. From a manufacturing standpoint, considerable insulation was eliminated by the use of the non-conducting housing, much machining was done away with because of the ease with which inserts and holes could be incorporated into the molded piece and, finally, a more lasting finish was provided without the laborious coloring and finishing operations called for when metal is used. The molded finish, going all the way through, lasted as long as the part itself, thus providing a vastly lengthened phone life.

It was soon discovered that, for certain installations, it was advantageous to incorporate the bell-box (ordinarily fastened on the adjoining wall) within the instrument itself. This induced a modification of the design which raised the stand, creating a pedestal effect within which the ringing equipment was located. Here again, molded plastics were used throughout.

In both these models, traditional shapes, induced originally by the conditions imposed by the former used metals, were followed. Now, a new model has been introduced which takes advantage of the structural design and color possibilities of molded materials.

Again, the bell box has been eliminated. But this time the instrument stand has been shaped for greater stability, with a rectangular, cropped cornered base. The sound louvres, for the ringing bell, have been incorporated in the molding itself and the neck and cradle moldings have been eliminated. The one-piece job also has thicker cradle arms, designed to eliminate breakage possibilities in spite of the roughest handling accorded the phones by quick tempered executives.

Color too has been added. The new monophones are available in Chinese red, jade green, royal blue, maroon, Nile green, orchid, ivory, mahogany and walnut, as well as in the conventional black. Silk cords match in color Fittings, when desired, can be

★

had in chromium or gold plate. Through the use of plastics, the change-over from one color to another has been immensely simplified as a manufacturing operation. Instead of preparing separate runs of enamel and producing each color as a separate, small and, hence, expensive operation, it is merely necessary to change the molding powder to secure a different color. Needless to say, color adds immeasurably to the sales possibilities of these phones both in group installations (as in the use of ivory or white in hospitals) and in the sale of single phones or small installations to replace rented phones of conventional color.

The Automatic Electric Company recently designed another unique phone system in which molding played a crucial part in the winning of large contracts. It was required that a phone system be planned as a last line of communication for United States Naval vessels, the specifications calling for practical indestructibility.

Strength requirements called for a phone able to withstand repeated shocks of impact against metal bilkheads and to withstand the probable shocks incident to prolonged gunfire. The naval authorities standard laboratory and scientific material tests more severe than any so previously specified—so severe, in fact, as to seem impossible of fulfillment at first glance, requiring, as they did, a phone that was practically unbreakable.

The Automatic Electric phone did not break, because it was constructed entirely of molded phenolics in which canvas scrap had been used as a filler. This particular type of molding sacrifices something in appearance and finish but gains immeasurably in strength.

Another instance in which Automatic Electric has replaced metal with molded resins is found in the redesigned bell-box for wall attachment. When it was

decided to re-tool for a reduction in size of the customary bell-box the opportunity presented itself to substitute plastics for metal and thus to provide a piece more easy to manufacture, requiring fewer fabricating and assembly operations and providing decided advantages in use—notably in its lasting finish, its freedom from moisture-caused shorts and its variability in color where required.

It is likely that many more opportunities for the use of plastics will be taken advantage of by Automatic Electric as other items come up for re-tool and redesign. The case of the reduced bell-box is, in this respect, typical of that of many manufacturers who hesitate to take advantage of molding because of their investment in metal working jigs and dies. When an overhauling of design is indicated or when new developments call for re-tooling, such manufacturers frequently find it advantageous to review all their manufacturing process. When such a review is obtained, molding comes out a winner, time after time.

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A modern nine-piece dresser set produced and marketed by the Celluloid Corporation

THE EVOLUTION OF STYLE IN PLASTIC DRESSERWARE

by Leo Marder

Celluloid Corporation

ONE of the earliest uses for pyroxylin was in the manufacture of articles for the dressing table. The material itself was invented in 1868. How soon after the first toilet articles, such as mirrors, brushes and combs, were made we have not been able readily to discover, but in the files of the Celluloid Corporation there is a catalogue printed in 1888 which offers for sale and illustrates a large collection of such articles. From the extensiveness of the line there recorded and the intricate molded decorations it is evident that the first production of these items antedated the printing of the catalogue by no less than five years, so that Celluloid brushes, mirrors and combs were probably first made in the 1880's.

Boudoir accessories are not modern inventions. Almost from time immemorial they have been for the ladies a necessity. And since they have been primarily for the ladies they have generally been invented with artistry and beauty. Until the invention of synthetic plastics these toilet accessories were usually made of materials such as silver, elephant tusk ivory, amber and tortoise shell. These materials were all expensive, rare and valued because of their great beauty.

You probably remember that the motivating influence that led to the invention of Celluloid by Hyatt was the desire for a material to replace ivory in billiard balls. The earliest Celluloid made, therefore, looked like ivory. It could be produced in any required volume and in many respects was better than the natural product though much less expensive. Naturally, therefore, its makers turned toward the manufacture of goods then being made of the real ivory.

And so back in the early 1880's a line of ivory toilet articles was developed. In a collection of products made of Celluloid I have found a set which from its design indicates that it was manufactured about 1884. The articles are molded and consist of embossed designs in Celluloid over wood cores. The fine condition of this set, now 50 years old, gives testimony not only to the stability and permanence of the material used

but to the high state of manufacturing technique that had been reached in this plastic as early as 1884.

During the next few years toilet sets were made in shell and amber colors. The aim in such color development was the duplication of the handiwork of Nature, and so faithfully was this done that in many instances it was difficult to distinguish the color and beauty of the man-made product from that turned out by Nature.

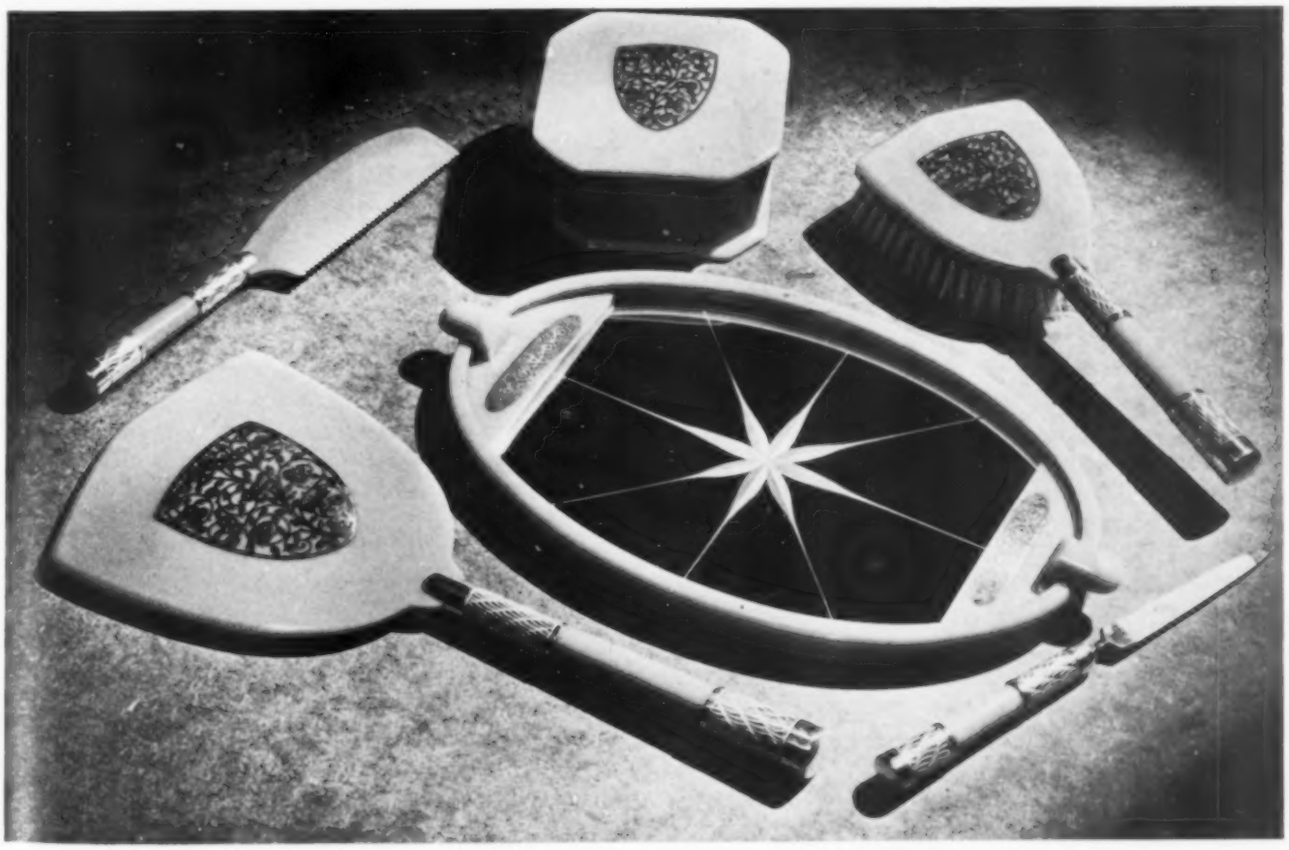
Until 1914, a period of over thirty years, toiletware continued to sell in the three materials: ivory, amber and shell, with ivory representing approximately 90 per cent of the total. Almost from the day of its introduction the sales of "Ivory" which came to be synonymous with Celluloid toiletware increased by leaps and bounds.

About 1915 the idea was conceived of combining two colors in the one article by compositing or cementing different colored sheets together. For a while compositing problems were troublesome but it wasn't long before they were overcome and then began a vogue of sets in combinations of colors. Then after thirty years of undimmed lustre, ivory as a leading toilet set color was displaced. In the course of a year or two it dropped from use almost completely and it remained in oblivion until the designers of a later day with a new technique gave its beauty modernity again.

The new color combinations consisted generally of a layer of thin material on a (*Continued on page 59*)

Three pieces from a set manufactured around 1884. . .lasting testimonial to the stability and permanence of pyroxylin materials. Taken from the Celluloid Corporation's collection and shown through the courtesy of that corporation

Modern sets combine glass, metal inlays and the colors of the pyroxylin materials themselves to achieve beauties utterly different from those of the earlier ivories, golds and silvers. From imitation, manufacturers have passed on to the treatment of pyroxylin as a "true" material. Style tip . . . look for designs along neo-classic lines, as soon as the buying public gets warmed up sufficiently to accept them. Photo courtesy Celluloid Corp.



The walls of this Print Room are of prefabricated plastics, the print rails being molded in and held in place without the use of hardware. Their well planned spacing permits prints of various sizes to be displayed

FURNITURE IN THE MODERN MANNER

An interview with Donald Deskey as reported by E. F. Lougee

I ASKED Mr. Deskey, as I have asked other designers, what he thought about the future of plastics as fundamental materials.

"I suppose you would like me to say that plastics are marvelous, that they are the greatest materials in the world, and that they are going to revolutionize industrial design and eventually replace many other materials in all lines of manufacturing endeavor. Well, I hate to disappoint you but it would be silly to say any such thing," he replied, and grinned.

"I have been experimenting with plastics and pioneering their use since the early 1920's mostly in the home furnishing field in which I have a very deep interest. So far as I know, I was the first designer to combine plastics with metal in making furniture so you can see I had an early interest in their fabrication. I used plastics for the first time as a table top in a room I designed for a private client, and chose that material because of its resistance to cigarette burns and because it was the only suitable material that could withstand the alcoholic concoctions of that era.

"Shortly after this I began working with furniture manufacturers, creating modern designs, choosing materials, and getting them in workable form for large production. Plastics were naturally considered with other materials in this work.

"Let me say in the beginning that the designer's interest is primarily line and form rather than materials. The final appearance of the object must however of necessity be influenced by the purpose for which the object is to be used and by the materials of which it is made. Designs must be in themselves attractive to the ultimate consumer, and the object of such design must be visibly practical and comfortable to use.

This is especially true of furniture where I have enjoyed my greatest experience.

"That doesn't mean that choice of materials is unimportant but let me illustrate: Three boards can be fastened together and make a seat. It would be inexpensive and even might be attractive but it might be neither comfortable nor practical. To make the same seat of glass, or gold for that matter, would increase its cost and material value yet would add nothing to its comfort or practicability. Therefore design—line and form—become of first importance in any industrial undertaking.

"Choice of materials comes next and is largely determined by their adaptability for the purpose chosen. Appearance, strength, ease of fabrication and permanence must be considered. In any merchandising venture that is to succeed, each of these items must be weighed against cost which is perhaps the greatest influence in the final decision.

"I have recommended plastics in many instances where their use was ideal beyond doubt, but because of the cost of molding in small quantities, a material of cheaper fabricating cost was used instead. When an economical method of molding plastics in small quantities is discovered, their use will immediately increase.

"To predict or forecast the future of plastics would be futile and stupid. They are already accepted as fundamental materials along with metal, wood and glass. What their future holds will depend upon their development by those most interested in their success. They may find a place in the manufacture of furniture and other industrial merchandise as great or greater than they have found in closures and insulation. Metal and glass may find a similar place. Woods may eventually be discontinued. But there is the traditional association of wood and furniture which must be lived down. These new materials must definitely demonstrate their superiority over those they hope to replace before any great general acceptance is found."

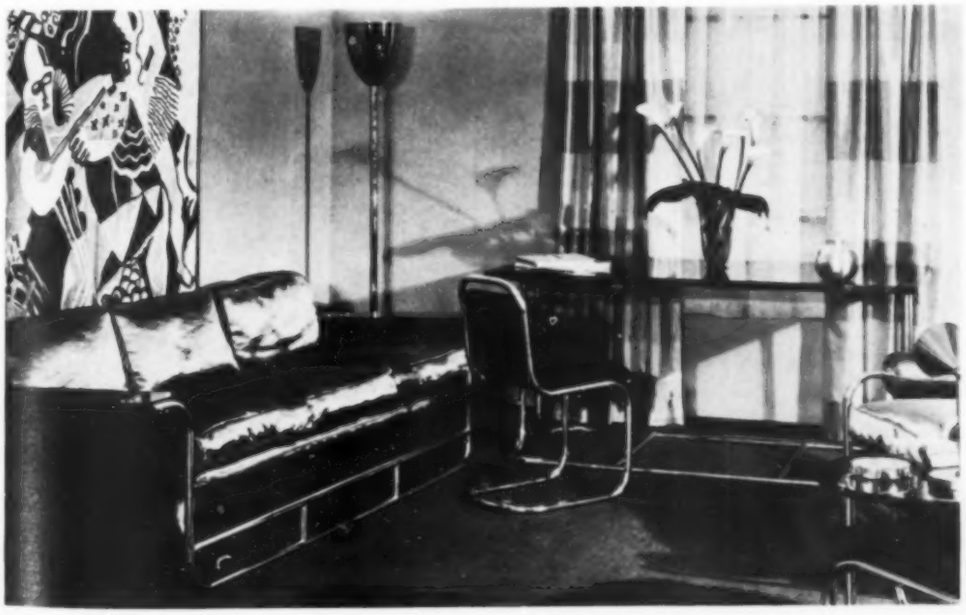
The plastic disc, feet and pedestal decoration on this lamp are supplied in black, white or red

From the very beginning, Mr. Deskey has taken every advantage of plastics as decorative materials. He was the first to convert a plastic disc and aluminum tube into a modern lamp. His next natural step was a modern table of similar combination except that the top instead of the base was of plastic. Then came furniture of tubular and extruded metal combined with plastics which he desgined originally for private clients, later adapting these designs to mass production and making them available to the manufacturers with whom he works.

Many of his lamps make use of plastics as a color key, either in decorative relief to the metal, or in combinations of colors to form the entire base or pedestal. Their permanence of finish and soft lustre add richness obtainable with no other material.

His furniture also shows an appreciation of the material as a decorative motif where color and strength make plastics desirable. Drawer pulls are frequently made from plastics where their rich contrasting color distinguishes the piece, and their homogeneous composition prevents any possibility of chipping as would enamel. In some places he has used clear plastics to lend the assimilated freshness and beauty of glass without the dangers of breaking.

Mr. Deskey works consistently in the home furnishing field and has unbounded faith in the future of modern furniture and decoration which he believes would have found much greater acceptance if American taste was not so notoriously bad in this particular direction.



A group from the first extensive mass-production program of modern furniture designed by Mr. Deskey. Note the plastic arms on sofa, and table tops

This lamp base of contrasting plastics sets on a table whose feet and top are distinguished by the use of the same material

In at least two important stores in New York City modern furniture represents 45% of current sales, and in other metropolitan centers it is rapidly gaining in percentage of sales over period and outmoded designs. Another reason for the slow acceptance of modern furniture is the hideous designs originally offered as modern by uninformed manufacturers, examples of which may be found in many stores today. This is being rapidly overcome, however, and a movement is under way to design a good looking line of modern furniture for every room in the house and place it in mass production so it can be offered at popular prices.

Mr. Deskey has devoted much time during recent months to this end and a recent exhibition at the Hotel Waldorf set furniture buyers agog with the beauty and prices of the items offered. Mr. Deskey is working with several manufacturers in their production and believes before long that modern will be the popular furniture throughout the country.

It would seem that plastics have a very broad potential opportunity in this field, but their extended use will depend a great deal upon the manner in which they are handled and in the progress made to develop their fabrication economically. If they are so handled that they become a distinct material of value not only as decoration, but as a funda- (*Continued on page 61*)

A practical reading lamp of polished aluminum and black plastic

No better materials than plastics are available for table tops

Molded phenolic plastic knobs have many advantages over metal knobs: they never rust, corrode, tarnish, dent, peel, chip or wear shabby, do not conduct static sparks, and always feel pleasant to touch. Photo, courtesy of General Plastics, Inc.

DOOR KNOBS

by Franklin E. Brill

General Plastics, Inc.

THE late Raymond Hood, famous Radio City architect, left to posterity a specification for the perfect door knob. "It should be unobtrusive," he said. "Every one knows there's a knob there, and you grab it instinctively when it's placed right. It should be small, in an oblate spheroid shape, smooth and without any germ-catching indentations. Dark solid colors. And this constant cleaning and polishing and static sparking is ridiculous—knob and escutcheon should be molded of this synthetic plastic material."

Molded plastics have probably never received stronger recommendation than the words of this famous architect, nor have they ever had a more logical market than door knobs. One of the best rules for finding applications for the sleek surface of molded plastics has always been, "Use them on things people touch," and door knobs certainly fit the rule. And it's a staggering market. The number of doors in the United States alone has been conservatively estimated at 200,000,000, which includes home, office, factory, hotel and public building doors. Each of these doors has two sides, which brings the number of door knobs in actual use today up to 400,000,000. It would take the average molding plant twelve years of capacity work to replace them all with molded plastic knobs.

Four hundred million door knobs—now mostly made of die-cast or stamped brass, bronze alloys, and ceramic materials. None of the present materials are entirely satisfactory. The metal knobs corrode, tarnish and discolor from the air and perspiration, requiring periodic

polishing. In large buildings cleaners are constantly at work polishing the knobs and escutcheon plates, and when they finish the top floor they start again at the street level. Services like this are notoriously expensive. Ceramic knobs, while requiring no polishing themselves, need metal escutcheons and exposed metal shanks, and their fragility has limited their use to the lighter applications like boudoir closet doors.

While these factors are important, the greatest objection to present door knobs is their tendency to cause static sparks when touched. Any one who has walked across a carpeted floor or down a hotel corridor and grasped a metal door knob will vouch for the unpleasantness of the sensation. Some people, more susceptible to static charges than others, live in constant fear of door knobs. Hundreds of businessmen have insulated their office door knobs with electricians' tape to prevent it, as any canvass of the Grand Central zone office buildings will show. The appearance of the taped knobs, as shown in an accompanying illustration, is ludicrous, but then so is the average person's reaction to the sparks. The increased use of carpets in home and office would seem to establish the case for the present knob as being progressively worse instead of better.

Metal door knobs crudely covered with electricians' tape to insulate the hand against static sparks are frequent sights in almost any metropolitan office building. To some, these sparks are trivial; to others it becomes a full fledged phobia. Photo, courtesy of General Plastics, Inc.

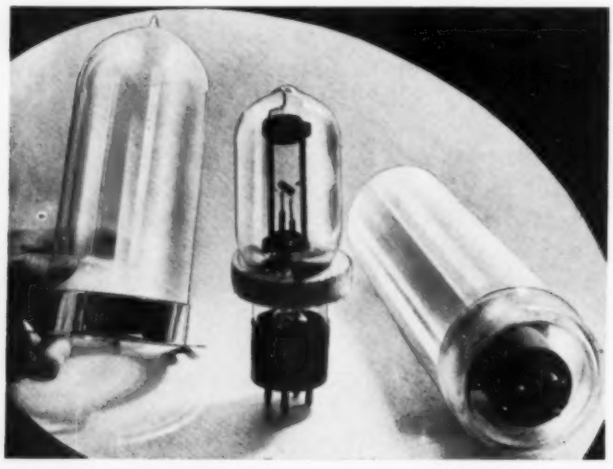
Contrast this with molded plastic knobs. In the first place, fabrication of the plastic knobs is simpler, because they require no finishing, buffing or plating. They come from the mold ready for use, with that famous sleek, sympathetic finish automatically produced. Seals, insignias, crests, as well as threads in the shank, can be produced without extra operations, or metals can be inlaid. Colors can be varied at will. And, when placed in service, they never require polishing or cleaning, since no amount of perspiration, fumes or atmospheric moisture can corrode or tarnish them. Escutcheons, molded to match the knob, have the same qualities. Static sparks are impossible, because plastic materials are excellent insulators. There is no surface coating to wear off, chip or check, and the knobs retain their new look forever. Keyhole plates can be included in the center of the knob, because the knob can be easily molded with a channel extending from shank to knob-face. Shapes of any description can be made. (*Continued on page 59*)

PLASTIC MOLDED BASES FOR HIGHWAY LAMPS

Westinghouse has recently perfected an unusual sodium vapor lamp, for highway illumination, in which an eliptical bulb encloses an inner tube containing sodium. Operating on two circuits, these lamps require four contacts. Naturally, Westinghouse turned to plastic molding as the most economical and practical way of providing a sturdy, short-proof base.

This lamp, however, presented unusual problems in that a plastic was necessary that would conserve heat and maintain the high temperature necessary to vaporize the sodium. For this purpose a heat-resisting plastic was devised to resist temperatures of 250 degrees. Along with this, a special basing cement was prepared, likewise heat resistant, for attaching the base to the glass bulb.

In molding the bases, the usual procedure is not followed. Instead the powder is first shaped into a small ball, then formed in a hot mold under high plunger pressure. The metal pins are inserted, after removal from the mold, by a special process.



Typical of literally thousands of storefronts, transformed in recent years, is this A & P shop, in which laminated plastics have replaced the old metal letters and the red paint front. Photo courtesy of Micarta Engineering Department, Westinghouse Electric and Mfg. Co.

DECORATIVE LAMINATED PLASTICS

by L. O. Marstellar

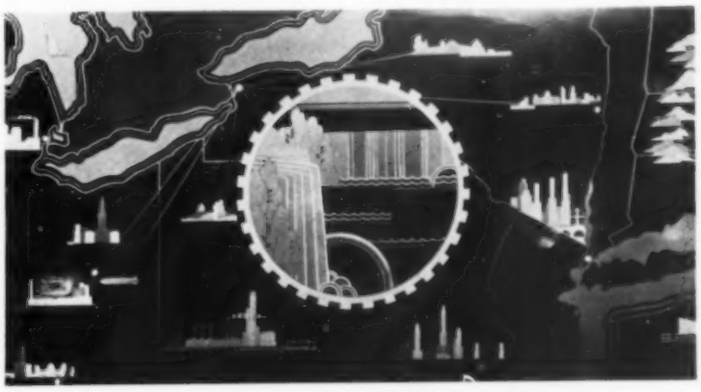
Micarta Engineering Department, Westinghouse Electric & Manufacturing Company

AN OLD world with old materials whose modern people were mighty tired of the commonplace things caused decorative laminated plastics to be created and developed along commercial lines.

Regardless of the amount of money available and the inborn desire to have or to create something new in design and distinction, something really outstanding and different from what the rest of the world was accustomed to, we have been forced in the past to content ourselves with the staid old heirloom materials as inherited from the Stone Age and other materials now historic. Not that these old materials were not good; they were good, good in their age and good today—in their place and station.

Imagine some of our modern creative artists such as Bel Geddes, Donald R. Dohmer or the late Joseph Urban fretting over a modern building or room decoration problem, attempting to produce something distinctive, something for a client whose patronage demanded a treatment in keeping with the days of 1934. Imagine trying to do this with marble, stone, wood or painted surfaces. It would be asking too much to expect anything unusual. However, give these men a new type of surface, a new texture, plain and in colors; then give them a free hand to decorate such a material with a metallic inlay in a color of any hue, value or chroma, in inlay with a bright lustrous metallic sheen ranging in color from

(*Continued on page 56*)



Two intricate murals fabricated of a combination of colored metallic inlays and various colored laminated surfaces. Photo courtesy of Micarta Department, Westinghouse Electric and Manufacturing Company

MODERN PLASTICS SPONSORS FIRST ANNUAL PLASTICS EXHIBIT

Twenty-five Thousand Objects, Covering Every Type and Field of Application, to Continue on Display Until December Twenty-two

FOR the first time in the history of the plastics industry, a comprehensive display of every one of its varied product-groups has made possible an appraisal of the industry's record of progress.

And what a record that is!

Within a period of two decades, plastics have changed from a small group of products of comparatively limited application to become a vital factor in almost every phase of manufacture. Old materials, such as pyroxylin, have been improved in stability and uniformity—new materials, phenols, ureas, cellulose acetates, caseins have opened up vast new fields. Laminated plastics have won a dual victory, conquering large sectors in the machine building, automotive, textile and the electrical fields while, as decorative rather than industrial materials, they have won a growing importance in the eyes of leading architects, builders, furniture manufacturers, sign and display makers and naval architects.

Now for the first time, the leading material manufacturers and fabricators of all the various types of plastics have combined to present to the interested public the rounded picture of their accomplishments. Under the sponsorship of MODERN PLASTICS and in its exhibition hall, they have gathered together over twenty-five thousand separate items ranging almost literally, "from ships to shoes, to sealing wax, to cabbages and kings."

Probably the greatest factor at present holding back the use of plastics is the lack of public knowledge of their possible application, a void which this and future exhibits are planned to fill. For among the thousands of articles exhibited are applications as widely varied and as astonishing to the uninitiated as any in Carroll's list. There are gears, boxes, tank-balls, hair waving equipment, switches, distributor-heads, stove handles, displays, biscuit-cutters, measuring cups, salt-cellars, ash trays, picture frames, cream jars, powder jars, toaster bases, rheostats, cups, tumblers, radio dials, cigarette lighters, toys, dishware, closures, radio cabinets, match dispensers, vases, door knobs, escutcheon plates, kick plates, switch plates, soup plates, glasses, glass holders, eye-glass frames, dice, dresser sets, corrosion resisting equipment, heat resisting equipment, shock resisting equipment, signs, clocks, clock cases, clock parts, watches, pen stands,

pens, pencils, fishing reels, fishing lures, paper mill equipment, bearings, pouring closures, soap dispensers, rayon spinning equipment, book racks, book covers, brush handles saw handles, chisel handles, knife handles, tea strainers, coffee percolators, lamps, lamp shades, light sockets, statuary bases, barometers, artificial teeth, telephones, telephone stands, fans, combs, automobile fittings, refrigerator fittings, microphones, microscopes, cameras, razor handles, checkers, chessmen, buttons, toothbrush-handles, opera glasses, shoe heels, goggles, rotors, dictaphone parts, toilet seats, thermometers, lighting fixtures, pool-ball-racks, electrical recordings, thimbles, pocketbook frames, desk pads, book ends, gear-shift knobs, compacts, coasters, wall surfaces, lighting enclosures and translucent signs.

And where these articles have been gathered, more people have become acquainted with the possibilities of plastics in a single week (*Continued on page 43*)

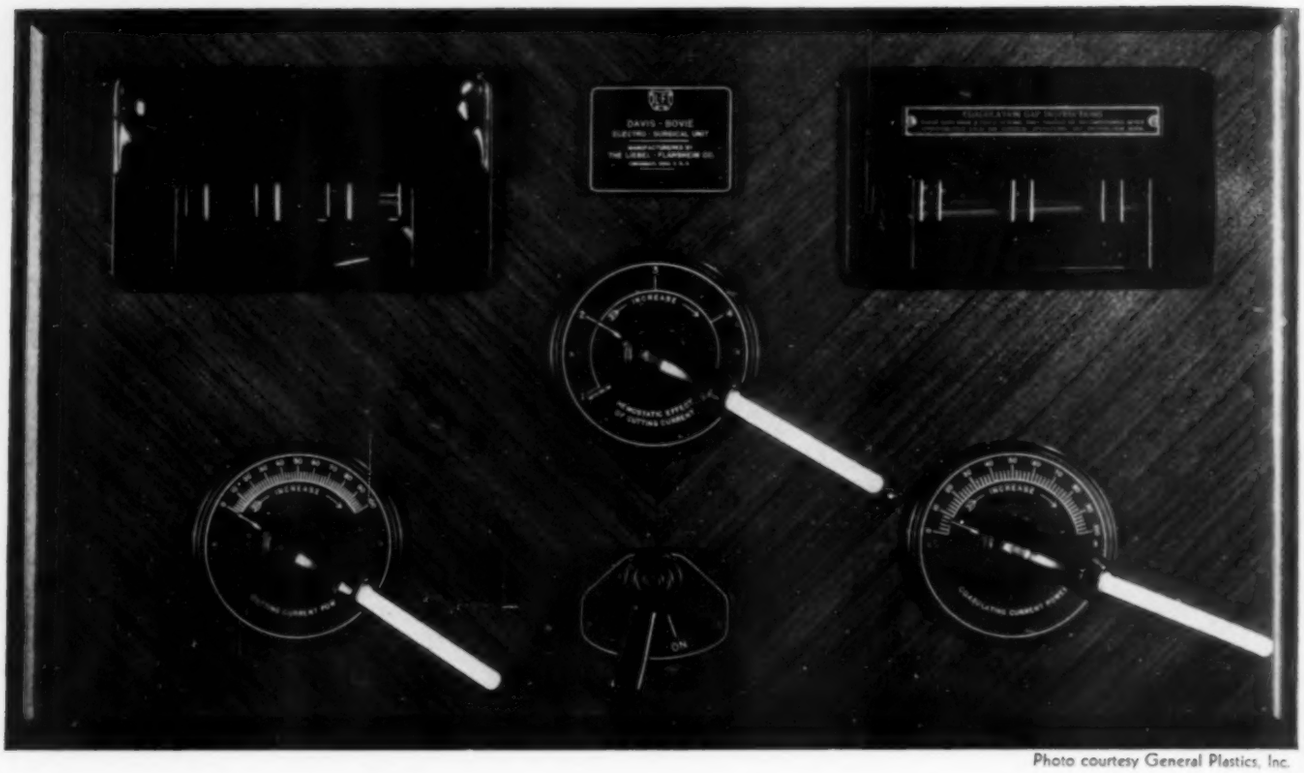


Photo courtesy General Plastics, Inc.

SUCCESS STORIES

★

Product: Davis-Bovie Electro-Surgical Unit
Manufacturer: Liebel-Flarsheim Co.
Designer: Design Department, Liebel-Flarsheim Co.

Description:

Any one familiar with doctor's offices should be familiar with the average diathermy machine. Using high-tension electric current for the dessication and bloodless removal of diseased or superfluous tissue, they have been housed for years in clumsy, ugly cabinets—some of them huge and terrifying. Most often they resembled machines, and the idea of housing them in smart, well-proportioned cabinets *as furniture* originated with the Liebel-Flarsheim organization.

Another consideration which pointed toward more civilized cabinet design was the growing trend toward more attractive furnishings in doctor's offices. The appeal of the Davis-Bovie diathermy unit was necessarily to the more progressive of the medical profession—since the older doctors tend to fight shy of the "new-fangled" idea of bloodless tonsil and tissue removal—and the younger doctors naturally demand a more modern appearance. Diathermy is used largely on children, and the more harmless the device looked, the less trouble the doctor naturally would have.

Molded phenolic plastics play an important part in the new, improved model, permitting centralized terminal-plug plates and an orderly, balanced top panel. The cabinet itself is hardwood frame with matched veneers in modern, straight-grained wood, accented with stamped and plated handles and die-cast zinc drawer pulls for the instrument and electrode compartments. The overall impression is one of neatness and precision.

The top panel particularly shows a tremendous change from the older types of diathermy units. Here are centered all the controls for regulating spark gaps, cutting current, coagulating action and the hemostatic, or cauterizing, effect on the blood vessels. With the extremely high voltages used, a material was required which would reduce losses and eliminate possibilities of grounding through careless contact. A phenolic molding material was decided upon, and General Plastics' Durez, in lustrous black, was used, preventing any high-tension losses. Spark gap covers, switches, terminal plates, and the three round control dials are all molded—care being taken in designing them to keep a balanced appearance. Scales and identifications are wiped in with white pigment, making them all two operation jobs—molding and wiping-in.

Sales Results:

While it is still rather early to get a comparative sales check-up against former models, Liebel-Flarsheim officials are extremely well pleased with the sales results up to the present time. While it is freely granted that more attractive design cannot in itself sell a diathermy unit, the manufacturer was equally convinced that an ugly, cumbersome, old-fashioned

appearance certainly did not make the sale any easier. As one link in making the sale, the new improved design is considered 100 per cent successful.

★ ★

Courtesy of Toledo Synthetic Products, Inc.

Product: Personal Deodorant
Manufacturer: Feminine Products Company
Designer: Colt Patent Fire Arms Co.
Description:

A packaging story, pure and simple.

When introduced, Perstik—the "lipstick" deodorant—was put up in a paper wrapper. Sales did not approach the volume that a previously made survey had indicated wholly possible. To create more style and eye appeal, an attractive black and white container of octagonal shape was designed to hold the product. Sales mounted rapidly, and then, as suddenly fell off. It was soon discovered that the trouble lay with the paint on the metal. This chipped when it came in contact with the other metal accessories in the handbag. Also, the paint wore off with handling. The manufacturer turned to plastics and commissioned Colt Patent Fire Arms Mfg. Co. to mold a pattern. The latter economically used the same design that had been drawn for the metal container.

Materials:

Black Durez and Ivory Plaskon were the two plastics used to achieve the present durable and good-looking container.

Sales Results:

Sales have jumped 25% above the peak enjoyed by Perstik when it was packed in metal, and when a percentage of the sales must be attributed to its novel shape. The plastic container has been on the market for more than a year, is daily gaining new friends, and is an excellent demonstration of the importance of packaging in which plastics are used.

★ ★ ★

Product: Pocket Camera
Manufacturer: Rocamco Products, Inc.
Engineering Design: R. Rochester, Rocamco Products, Inc.
Description:

Two years ago, a complete pocket camera to sell as a twenty-cent item in five- and ten-cent stores might well have been considered a practical impossibility. Today, it is not only a reality, but a commercial success, having been produced and sold in quantities exceeding a quarter million, with more in the making. Although not outstanding from an artistic point of view, the camera is as pleasing in appearance as the limitation in cost and the character of the trade seemed to dictate. Originally, it was made in plain black, with front and rear surfaces stippled to resemble a black pinseal leather. More recently it has been made in brown containing mottled color splotches.

As will be seen from the illustrations, the camera consists of two major and three minor molded parts, including the film spool fur- (*Continued on page 57*)

Courtesy Tech-Art Plastics, Inc.

DESIGN PATENTS FOR PLASTICS

by Waldon Fawcett

IF the plastics industry can secure special, preferential treatment for its applications for design patents, one of the most pressing problems of the period may be solved. To suggest that the inventions of an entire industrial community should receive attention at the U. S. Patent Office ahead of the discoveries of other groups may appear daring, to say the least. And yet there is a precedent—a very recent precedent—for the granting of this very concession which is so sorely needed if progress in plastics is to be maintained.

In only one quarter, be it noted, is this favoritism for plastics needed. As our readers realize, the creative forces of the plastics industry must needs employ, to protect their manufacturing monopolies and their markets, all manner of patent protection. Mechanical patents on the machinery, process patents on molding methods and all the other patent variations. But supremely important at this juncture is a species of ideas: entrenchment which is so often subordinated in industrial calculations, viz., the design patent. A glance at the situation will indicate why design patents represent the dominant factor in the present set-up of plastics production.

Before examining the scope of patents on design, it might be remarked, aside, that one reason why design patents have not had the attention they deserve as bulwarks of plastics prestige is that not a few busy executives have assumed that the inspiration-insurance they wanted was to be had in other forms. Captains of the plastics industry, who have not made a study of good will capitalization, have guessed vaguely that sufficient protection for originality was to be had by "copyrighting." Or by establishing, through registration, sole ownership of trade marks. The guess has been wide of the facts. Copyright entry and trade mark certification play a part, assuredly, in fencing the intangible assets of the plastics business against trespass. But the institution of design patent, and that alone, affords concrete legal protection for plastics models, patterns, styles and surface designs. Lacking design patent shelter, a plastics factor must fall back on the uncertain and costly remedy offered in the common law against unfair competition or the police power of the Federal Trade Commission.

Design patents (in contrast to the more common variety dealing with the moving parts of mechanisms) are concerned with the *appearance* of original creations. Under the terms of the law, a patent should be granted only for a design that is ornamental or decorative. As a matter of fact, this stipulation of artistic quality is winked at frequently. But the essence of the requirement holds. Subject matter for a design patent comprises the shape, form, outline or surface ornamentation of the article accepted as original. This naturally does not mean that a design to be patentable must be embodied in or applied to an article that is ornamental rather than useful. The most matter-of-fact, utilitarian articles may yet qualify, by their looks, for design patents. Nor is there any obstacle to covering an appropriate plastics product by both mechanical and design patents, thereby safeguarding the respective attributes.

Misunderstanding as to the precise scope of design patents has operated in some degree to restrain the industry from the fullest use of this agency. But, even greater degree, has operated the impediment of twin bogeys. One of these deterrent traditions is the handicap for which a solution may be at hand, as bulletined in our opening paragraph. Namely, the terror ofd elays in patent administration. For years-on end, creative industrialists in all lines have grumbled over the red tape and the deliberation of patent examination and certification. With any and all design patents this has been serious. Because, the very essence of design is modernization, novelty and timeliness. More serious than ever was the predicament when the plastics industry began its double-quick march. Slow motion routine in clearing plastics design was a drag upon design planning and upon fabrication. More than that, it brought a tragic lag in marketing. Marking time on the distribution of a new product in order to obtain a design patent franchise is bad enough if the candidate is a staple with a prospect of a long and profitable life, once it is safely stocked in the stores. Such suspension of activity is a catastrophe when it keeps off a transitory, short-term market a seasonal conceit or passing fad.

Solution for the second bogey is not in early prospect, yet must this complication be reckoned with because of the extent to which it messes the design patent situation. Worry Number 2 arises from the fact that Uncle Sam's whole system of patenting designs insists upon treating designs as "inventions," if these are to be protectable. An industry, such as plastics, which is distinctively blazing new trails is in the strongest strategic position with respect to demands for design invention. So many of its products are manifestly fresh conceptions—unique creations. But even in a virgin industry some ornamental motifs and inspirations are transferred and adapted from other fields. And here comes the rub of "invention." There can be no question of the originality of the subject matter. It is original, that is to say, with the authors. By the same sign, these rearrangements or new arrangements of elements old in the arts do produce new or different effects. But exacting U. S. examiners may deny that there is any evidence of the exercise of the inventive faculty. So, even in an industry so explorative as

plastics there is a proportion of original designs which are out in the cold. Just as a passing hint of how this limitation is causing embarrassment, it may be instanced that Federal censorship is loath to concede that color is an admissable instrumentality of design invention.

Speeding up the ritual of design patenting of plastics would not open the door to design—grafts and design-hybrids—but it would clear the atmosphere for invented designs. Thereby supplying a stronger incentive to the plastics designer to redouble effort to produce designs that are in a minor if not in a major degree departures from all previous versions. How this quickened program would serve we may see in the example supplied by the textile industry which has already been made the beneficiary of such a snuggling ceremony at the U. S. Patent Office. Even so, textile patterns have not the aesthetic dignity of three-dimensional designs in the plastics industry.

Fabric designers and color planners have, for years, faced conditions of touch-and-go marketing resembling the hazards which now confront pioneering stylists of special mold plastics. If the textile inventor of design had to wait from six months to a year and a half for this design patent he was apt to find that his market had gone stale, if it had not been poached. Nor did it avail if the owner of a potential best seller sent forth his novelty marked "Patent Applied For." Hit-and-run design-raiders treated this unofficial warning as a jest. More than likely, the design that ventured forth with its patent yet pending would be pirated before the traveling salesmen sent out by the design-developer could make their rounds showing samples to the trade.

Whenever the need of administrative reform affecting design patents was agitated at Washington, the textile industry was cited as the chief sufferer. Thus it came about that officials of the Department of Commerce, concurring with sympathetic sentiment in Congress, agreed to try out the plan to expedite the issuance of design patents on textiles. Under this plan, any textile application may, upon request, be made "special" at the U. S. Patent Office. This invokes arrangements whereby the case is acted upon as soon as possible after it is filed. Attorneys for all textile interests have been informed that if a textile design application is accompanied by a photographic print, in addition to the regular drawing, the design application will go immediately to the Design Division. This shortens the time that the applicant has to wait for action on his case. Instances have occurred under this short-cut method wherein design patents have been passed to issue in little more than one week.

As a further sop to impatient industry, the patent number is sent out by the Issue Division of the Patent Office with the notice of allowance, so that an applicant, upon receiving his notice of allowance, has all needed information as to the issue and number of his patent and may effectually proclaim to the trade and the public his attested property rights. In order to further take up the slack of design patenting, the Patent Office, in its experiment in the textile field, is allowing design claimants to file photographs or photolithographs in lieu of the conventional pen and ink drawings in India ink. This results in a considerable saving of time and money for the design owner whereas the Patent Office files are in receipt of superior representations, thereby improving the "search" facilities upon which scouting designers depend to dodge duplication.

Assuming that the above-described measures for design patent short-cuts and simplification are of practical advantage, it will remain for the plastics industry to convince official Washington that it is entitled to the same preferential treatment. Actually there is a double reason for systematic effort to obtain better treatment for plastics designs when on the waiting list at the Patent Office. On the one hand, there is the consideration that plastics designs are deserving of better-than-ordinary treatment at patent headquarters because, in so many instances, extensive advertising and merchandising plans are in abeyance pending confirmation of patent rights. Set over against this urge is the companion consideration that the plastics industry, having suddenly grown to the stature of a major industry, does not have, in the examining organization at the Patent Office even the facilities to which it would normally be entitled on its showing of strength and inventive activity.

Along with the agitation in plastics circles for a step-up in clearing plastics designs there is an incipient movement among large producers of special molds for a reduction in the official fee. First-hand investigation at Washington indicates that there is not too much hope for the success of this gesture in economy. The main reason is that while other patent fees have been increased several times and while the trade mark fees have been increased, the design fees have not been increased in more than fifty years.

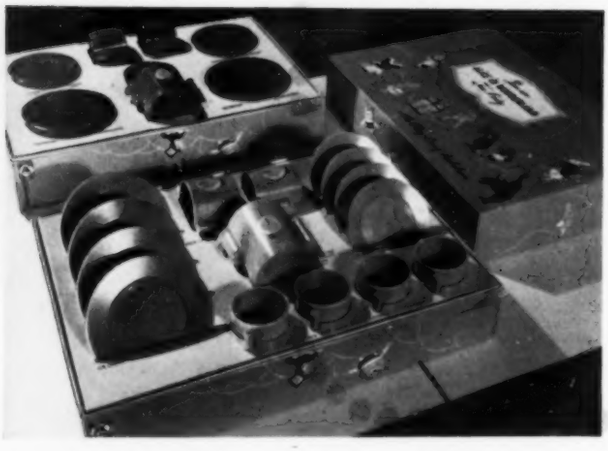
For participants in the plastics industry perhaps the most interesting of the pending proposals looking to the modernization of the design patent system is to be found in the project for a special offshoot. This undertaking, the moving spirit in which is John F. Robb of Cleveland, Ohio, seeks to have set up at the Patent Office a separate classification for what are known as "article-of-manufacture" designs. Which, of course, contacts squarely a large portion of the plastics line. This movement has been slowly gathering headway for several years. Lately it has taken on additional momentum, thanks to the example furnished by Canada which, unlike the United States, does not deny design protection to articles because they are not ornamental. In other words, the Canadian practice (which it is sought to transplant to the United States) is to protect manufactured articles of original design irrespective of the degree of ornamentation, so long as they possess novelty and originality.

The plastics industry, it may be said in all modesty, has been in no small degree (*Continued on page 56*)

PLASKON

TOYS:

Mr. Claus himself has approved these Alice-in-Wonderland tea party sets that Richelain offers to the Christmas-conscious parent. And rightly so. For Plaskon—molded color—has seen to it that they are alive with colorful fancy, and much sturdier than ordinary china or glass. All of which makes them exactly the present that Jane is thinking about when she promises to be very, very good. Molded by Richardson.



CLOCK:

As the molding material for all kinds of clock casings Plaskon continues in uninterrupted popularity. This time it is the new General Electric alarm clock which illustrates the smooth surfaces and enduring color beauty that Plaskon affords its users, along with unsurpassed adaptibility for molding.

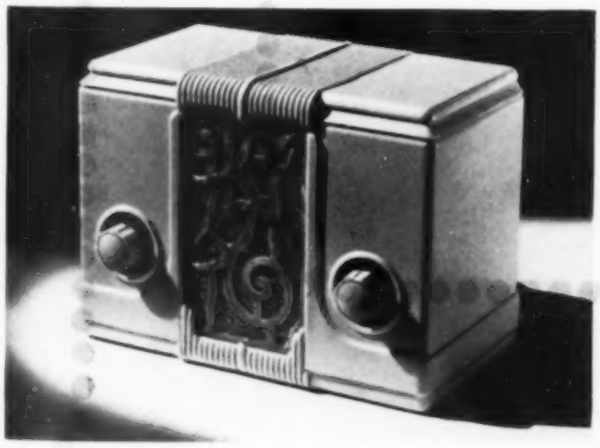
This is an unusual piece—a beyond ordinary molding job—in which the beauty of the simple line finds graceful—and lasting—expression. Ivory and gray were the Plaskon colors chosen to contrast with the gold-plated face rim and base band and the two decorative stars. Northern Industrial is the molder.

MOLDED COLOR

DECEMBER 1934

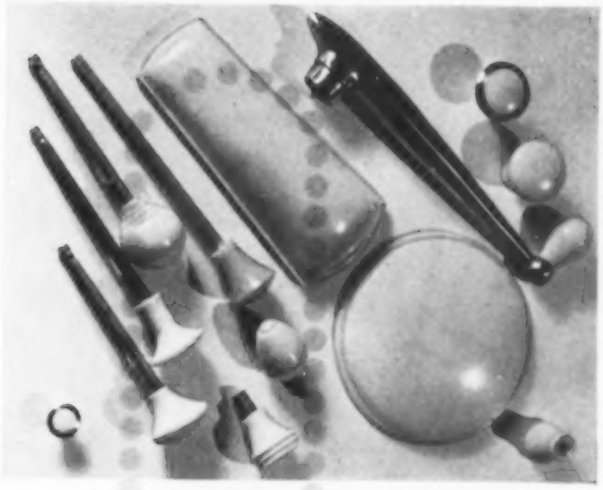
RADIO:

Brightly emerging at this merry Yule comes this radio cabinet, executed in gleaming Plaskon. Designed by the International Radio Corporation, the Kadette Jewel model is a striking instance of molding accomplishment made possible by this light, but extremely durable, plastic. The cabinet, which houses the remarkably compact machine, is made in five unusual colors ranging from a pale orchid to the clean brilliance of Chinese red. Here, as always, Plaskon's vast resource of color beauty assures satisfaction of any personal taste. Molded by Chicago Molded Products.



AUTOMOTIVE:

The people who design automobile interiors have been quick to realize Plaskon's unique adaptability to their needs. For harmony with upholstery and



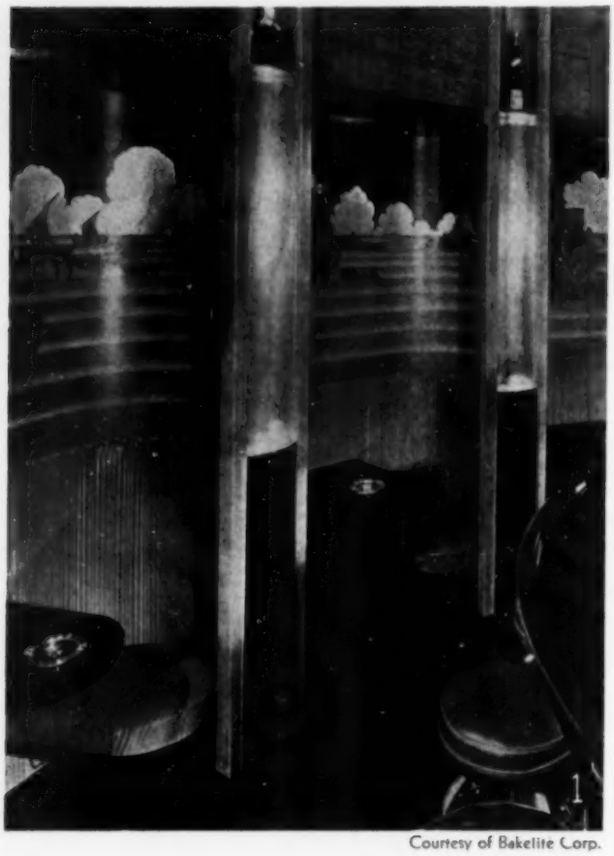
doing the job, it is unexcelled. Here are some appointments you'll recognize—dome lights, side lights, dashboard and window lever knobs—that have gained greater utility and a brighter beauty with Plaskon-molded color.

Your letterhead and your signature on it, will bring both the useful chain of Plaskon color discs and the Plaskon—molded color—booklet to you.

TOLEDO SYNTHETIC PRODUCTS INCORPORATED

TOLEDO - OHIO

FOR DUTY AND BEAUTY



Courtesy of Bakelite Corp.

Courtesy of Celluloid Corp.

Courtesy of Bakelite Corp.

Courtesy of Bakelite Corp.

Courtesy of Bakelite Corp.

1. Laminated plastic table tops beautify the alcoves of the St. Clair Hotel Bar, Chicago, while providing protection against alcohol stains and cigarette burns

2. A new use for Cellulose Acetate was invented by R. P. Murray when he used it in shaping the hull of this accurately scaled ship model

3. Introducing "Loxseal" a molded phenol device designed to make transfer or theft of license plates impossible. Once installed, plates can be removed only by breaking the "Loxseal"

4. This new, sanitary hair clipper employs a molded phenolic housing to contain the electrical actuating mechanism

5. The moisture-proof housing of this "Mark-time" switch is made of a molded phenolic, as is the dial, which has recessed lettering filled with white pigment for easy reading

Courtesy of General Plastics, Inc.

6. Because hard-rubber parts have a tendency to soften, these toilet tank-valve assemblies are now molded of phenol-resins, their water-resistance insuring the constant dimensions necessary for proper functioning

Courtesy of Bakelite Corp.

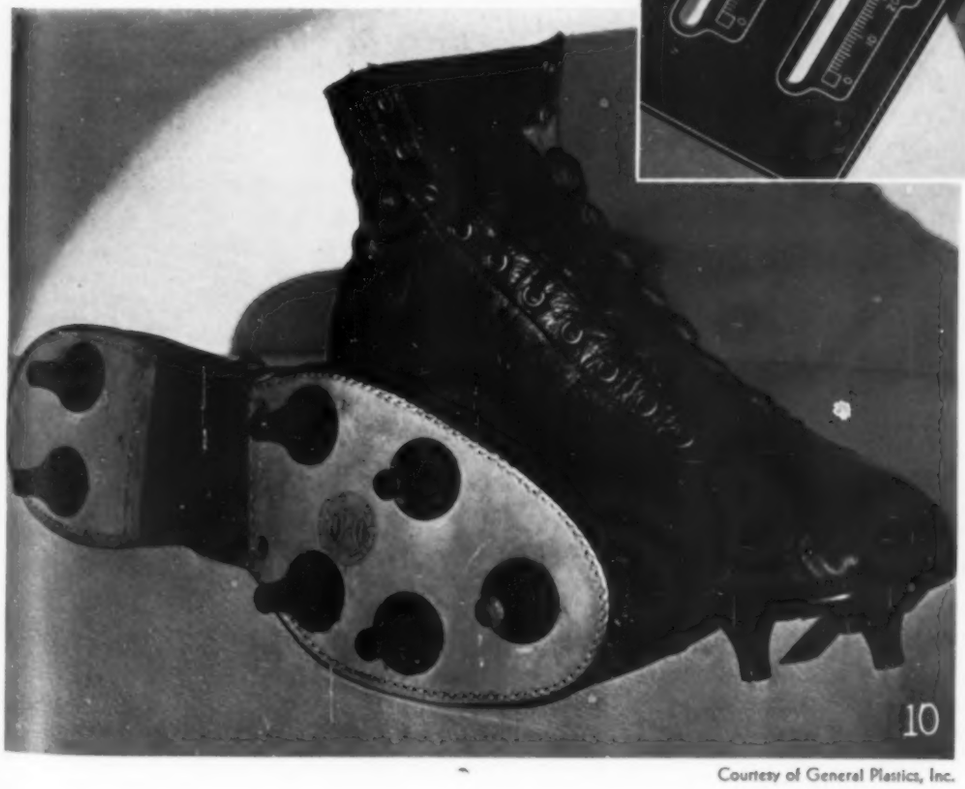
7. This airplane type automobile compass and compensator, made by the Hull Manufacturing Company, utilizes lustrous molded phenolic housings to harmonize with other dashboard appointments

Courtesy of Bakelite Corp.

8. Hammond Globes are now obtainable with black molded meridian rings set in similar bases which hold an atlas. Chromium plated metal adds a contrasting note

Courtesy of General Plastics, Inc.

9. These parts, from a Liebel-Flarsheim diathermy machine, are molded of phenolic resins to withstand high voltages and prevent grounding



Courtesy of General Plastics, Inc.

10. Molded phenol-resins are used by A. G. Spaulding Company for mud-cleates on football shoes. Providing long wear, they may yet be quickly replaced when worn

NEW IDEAS IN PLASTICS

For convenient reference and to keep readers posted on recent developments in the technology and applications of plastics, this department will include each month a digest of patent descriptions and abstracts of technical literature. The material will be presented in brief paragraphs with the sources of information given. Should further particulars on any published items be desired, inquiries may be sent to the Digest Editor, Modern Plastics

HARD paper products and electrical insulation in sheet form are much improved by suitable blending of the synthetic resins with linseed oil, tung oil or the like when the products are made and laminated. Thus, a sheet of paper or pulp can be coated on one side with the drying oil and on the other side with a suitable phenol formaldehyde resin, after which the blend is effected by proper application of pressure and vacuum and the resulting sheets are laminated as required. Or one sheet can be impregnated with oil, another with synthetic resin, and as many of such sheets as desired may be superimposed alternately to make a laminated product. High mechanical strength with great elasticity characterize the products. For use in electrical insulation they have the added advantage of extreme impermeability to gases. (Bakelite Gesellschaft m. b. H., German Patent 589,071.)

AS a remedy for the familiar nuisance of leaking in fountain pens, a new design in a molded pen cap is fitted with a self-wiping device comprising an inner cap firmly fitted into the outer cap, and a flanged space to receive any escaped ink so that when the point is withdrawn from the cap the ink, if any has leaked, is trapped and the point of the pen is wiped as the pen is withdrawn from the cap. (Solomon M. Sager, U. S. Patent 1,978,724.)

BASED on recent measurements of electrical properties, made in a Russian laboratory of applied physics, it is suggested that molded insulation and insulating coatings made from polystyrene plastics should be superior to the phenolic resins which are commonly used for insulation. (N. P. Bogoroditzki, G. F. Daletzki and V. N. Malyshev, J. Techn. Physics (Russian), Vol. 3, pp. 831–839.)

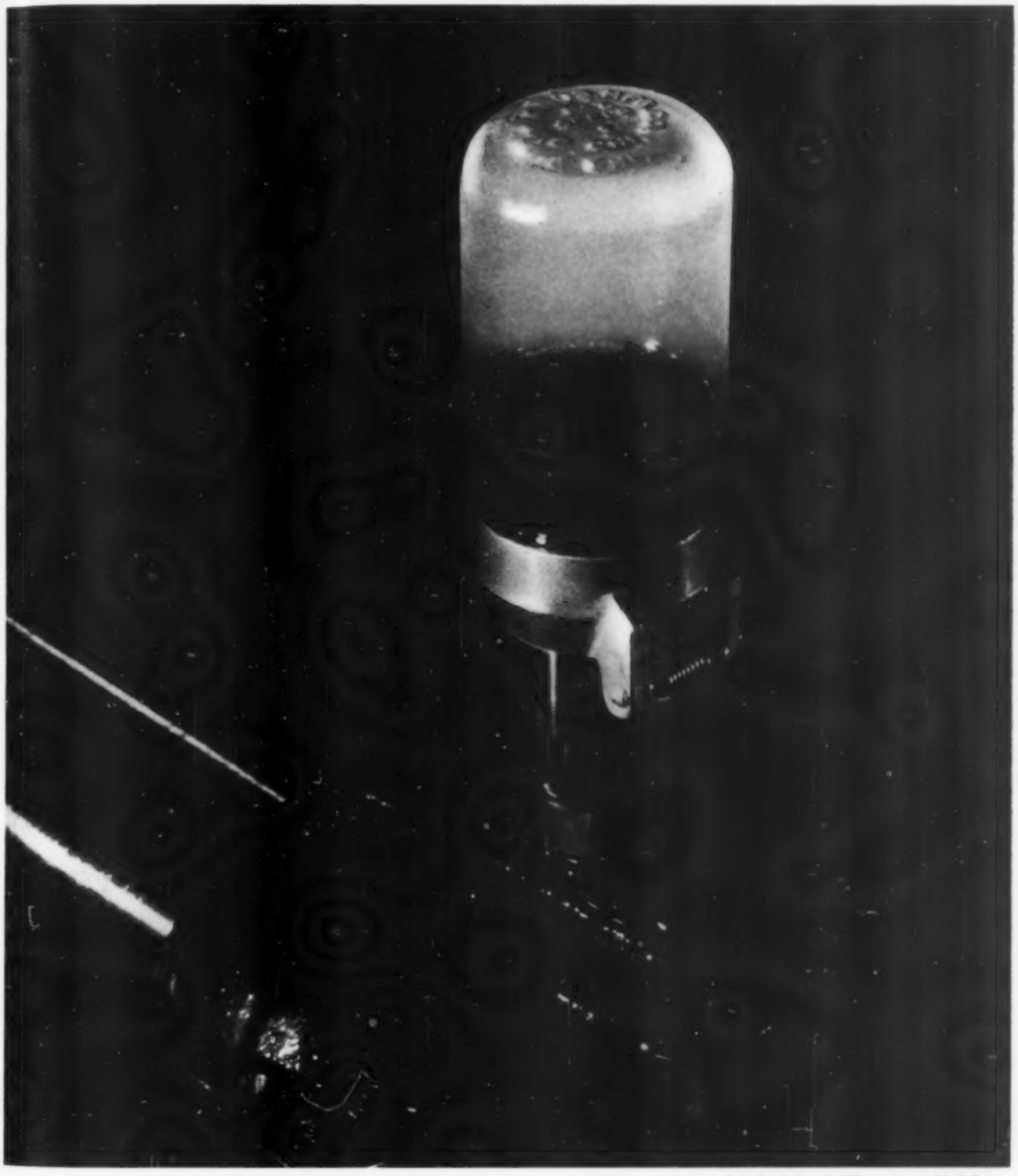
THE fire hazard, long a problem in the manufacture and use of the cellulose ester plastics, is accorded renewed attention in a new invention for making non-flammable cellulose esters which are useful for making practically fireproof molded articles. The cellulose is first esterified with an unsaturated organic acid such as crotonic or cinnamic acid; this ester is treated with chlorine as an efficient and inexpensive agent for diminishing the flammability of the final ester. After chlorination, the product is compounded with other ingredients as desired and used for making articles in which non-flammability is an important consideration. (Eastman Kodak Co., German Patent 588,876.)

CYLINDRICAL blocks of a molded fibrous plastic composition are proposed for making decorative goods in which very sharp definition of form and line can be achieved by turnery. For example, phenol formaldehyde is thoroughly ground with loose fibers and the powder is molded into a cylinder which can be carved, or turned on a lathe, into any desired shape, even including intricate carvings. (Naamlooze Vennootschap Rotterdamsche Handel en Crediet Maatschappij, French Patent 749,226.)

VINYL polymers such as polyvinyl alcohol, polyvinyl acetate, polyacrylic acid and the like are successfully adapted to the molding of phonograph records in a new system in which metal inserts are used to attain the required mechanical properties. The sound track surface has excellent properties for recording and reproduction of sound, and the plastic material is also readily adaptable for ornamental designs or advertising matter on one face of the record. (Consortium für Elektrochemische Industrie G. m. b. H., French Patent 761,578.)

CHEAP molding compositions extend the field of uses for molded plastics; hence there is considerable interest in the idea of making molded electrical parts, for example, for armatures, from materials made by treating lignite with phenols or with amines. Molding powders made in this way have a high bulk volume, but can be easily compressed by tableting or pressing into sheets before molding. Acidproof shapes made of the new material have high mechanical strength, and can be reinforced with metal inserts if desired. (Franz Fischer, Otto Horn and Hans Küster, Brennstoff-Chemie, Vol. 15, pp. 327–332.)

OPTICAL glass which contains no glass is a possibility offered by the recent invention of a German investigator. A search for an adhesive and cement which would be superior to Canada balsam for cementing lenses was productive of the substance sought, but as often happens in systematic research, an even more important possibility was brought out by the investigation. That is, it was found that the new material could itself be molded into accurate optical systems which could be used as such or in combination with glass systems. The principal ingredient of the molding composition is polystyrene, with added ingredients to aid its optical properties. (Ernst Brüche, for Allgemeine Elektricitäts-Gesellschaft, German Patent 600,945.)

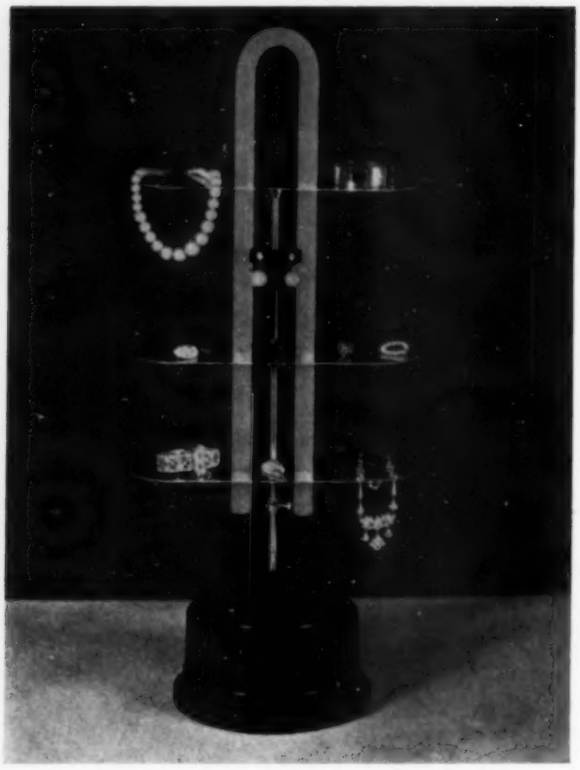


Constant Level Oiler cup molded from transparent Tenite by Gits Bros. Mfg. Co.

TENITE

now replaces glass in oil cups, making them unbreakable as well as transparent. For many other industrial products, designers are discovering that Tenite possesses the ideal combination of qualities . . . unexcelled toughness and shock resistance, easy machining, lustrous finish, a complete range of colors, and any degree of transparency. Samples of Tenite and an illustrated booklet on its industrial and decorative uses will be sent you on request.

TENNESSEE EASTMAN CORPORATION *(Subsidiary of Eastman Kodak Co.),* **KINGSPORT, TENN.**



A thin, adjustable metal rod supports the trays, which to the casual eye, seem to float on the ribbons of neon

MOLDED BASE FOR LUMINOUS WINDOW DISPLAY

IT is a well-known fact that bright colors, moving objects and loud noises are the most effective attention-arrestors in all the category of matter.

"If you have a show window where the display is necessarily, because of the nature of things, silent, can you still employ bright colors and moving objects effectively?" the inquiring reporter asked the inventors of a novel merchandise display.

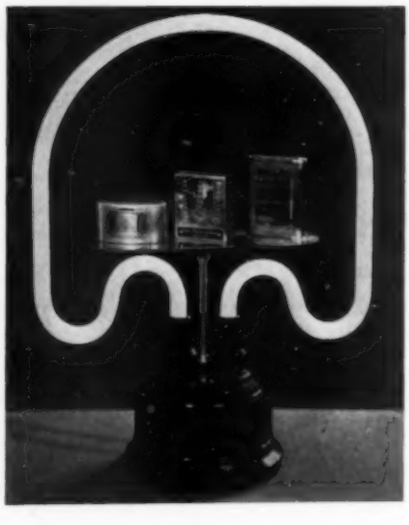
"Yes," say Ruby McRae and Henry Strahmann, whose new displays embody both of the above principles effectively. "And cheaply," they add. "The Scotch name suits a Scotch device, both efficient and economical."

The Ruby McRae displays, which we saw for the first time in the Emerson Radio booth at the National Radio and Electrical Exposition at Madison Square Garden, consist of a loop of colored light encased in glass, attached to a molded phenol resin base, with a revolving stand attached to the base moving within the loop. On the stand may be placed anything from small savings banks to men's shoes, from cigars to whiskey bottles, from chocolates to ladies' hats.

The theory of the displays is simple: The passer-by is attracted to this window display, first, because of the brilliant red light of this loop of glass. Or, for that matter, the light may be a luminous blue, or a green. It is produced by a combination of gases, varying according to the color desired, and sometimes including neon.

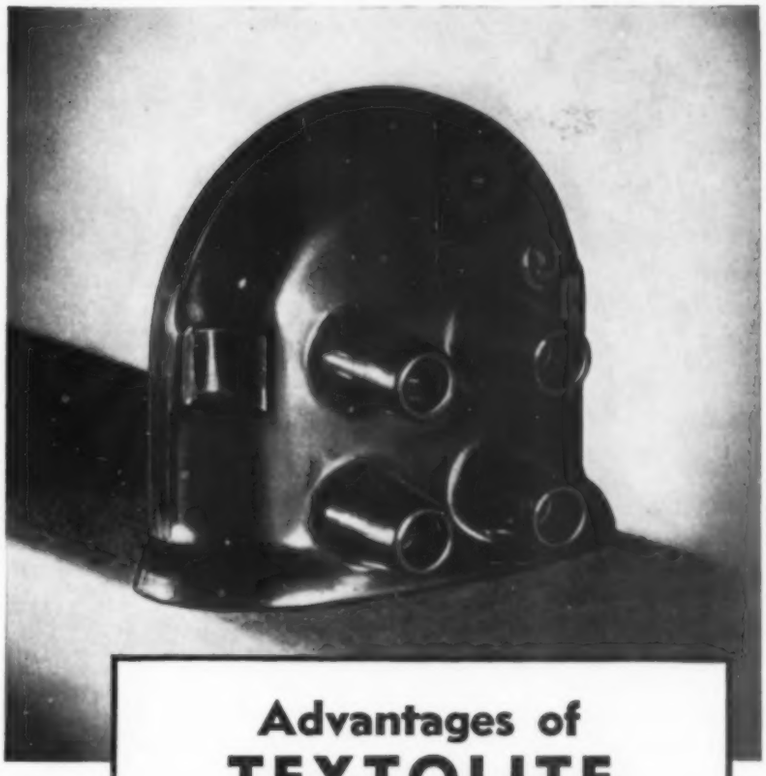
The construction of these displays is also simple, and the whole thing compact. Within the plastic base, which weighs only about six pounds, is the rotary mechanism, substantially built so that as much as fifty pounds of merchandise may be placed on the revolving plate. Into this base go both ends of the glass loop. And out of it emerges the necessary light cord by which the mechanism is plugged in to the nearest socket.

The cost of running the display is extremely low. For two cents a day—the amount it would cost to run a 40-watt bulb all day—the owner has a display which moves at the rate of two and a half revolutions per minute, slow enough for the reading matter to be clearly seen by the passer-by, and yet fast enough to provide a stimulus which will persuade him to look longer than one moment—the usual length of time a single display will attract him. The phenol resin base was molded by Associated Attleboro Industries.



Note the ease with which the same base may be adapted to displays of entirely different shapes and purposes

Here's a Material That Offers You More Than Just Good Insulation



FOR example, take this Textolite distributor head which we molded for a well-known manufacturer of tractors.

This product naturally required a material of high dielectric strength. But this company, by using Textolite, got more than just good insulation. It obtained a fine-appearing product with a smooth, glossy finish—a product with good mechanical strength and with ***excellent resistance to low-power, high-voltage arcs such as are found in automotive ignition systems.***

High dielectric and mechanical strength, fine appearance, and resistance to low-power arc-burning are only a few of the distinctive advantages of Textolite. Just glance at the table at the right. Note Textolite's unusual versatility—a versatility that makes possible the use of Textolite for almost any product.

Why not let us study the possibilities of making your entire product, or some part of it, from Textolite? We have already helped many manufacturers to improve their products and to increase their sales with Textolite. For complete information, address Plastics Dept., West Lynn, Mass.

Advantages of TEXTOLITE

1. High ratio of strength to weight
2. Resilience
3. Resistance to corrosion
4. Electrical insulation
5. Variety of form
6. Lightness
7. Does not score or adhere to metals
8. Uniformity of structure
9. Easily fabricated
10. Permanency of properties
11. Low heat Conductivity
12. Decorative

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NEWS AND DEVELOPMENTS

ANOTHER MOLDED WESTCLOX

The experience of the Western Clock Company with their molded, compact-shaped, handbag watch, has been so successful that they have now utilized a molded case on another member of their small-clock line. As shown herewith, this model is rectangular in shape, with rounded top and bottom—having much the appearance of a vest pocket camera. The lustrous black molding is set off by a shining metal bezel framing the square face. The frame is molded in two halves, held together by screws inserted from the back. A small hinged door at the back provides admittance to the regulating and winding levers while a hinged easel supports the clock or folds out of the way as desired. Credit: To the Chicago Molded Products Company for molding of both this model and its companion, the handbag watch.

NEW NEEDLE PYROMETER

The Cambridge Instrument Company has developed a new Needle Pyrometer, designed to serve the need that has developed for an instrument to determine more accurately the temperature of materials in the plastic state during certain operations. Approximate methods of indicating these temperatures, as formerly used, were unsuited to present-day requirements.

This pyrometer is of the thermo-electric type, its operation depending upon the well-known principle that when two wires of dissimilar metals are joined together to form a closed circuit and one junction is heated, a varying electromotive force is set dependent upon the difference between the temperatures of the hot and the cold junctions. This electromotive force may be indicated upon a millivoltmeter calibrated to read directly in degrees Fahrenheit so that no calculations are necessary.

The Immersion Element of the pyrometer is a sensitive thermocouple housed in a hollow needle of stainless steel, similar to a hypodermic needle. The latter protects the thermocouple and provides the necessary stiffness for insertion into plastic materials. A length of flexible metal tubing containing the necessary leads connnects this element to the Indicator which is provided with a convenient handle.

The Indicator has an easily read scale, three inches long, calibrated directly in degrees Fahrenheit, with a standard range from 50 degrees to 400 degrees. Special ranges may be furnished if desired.

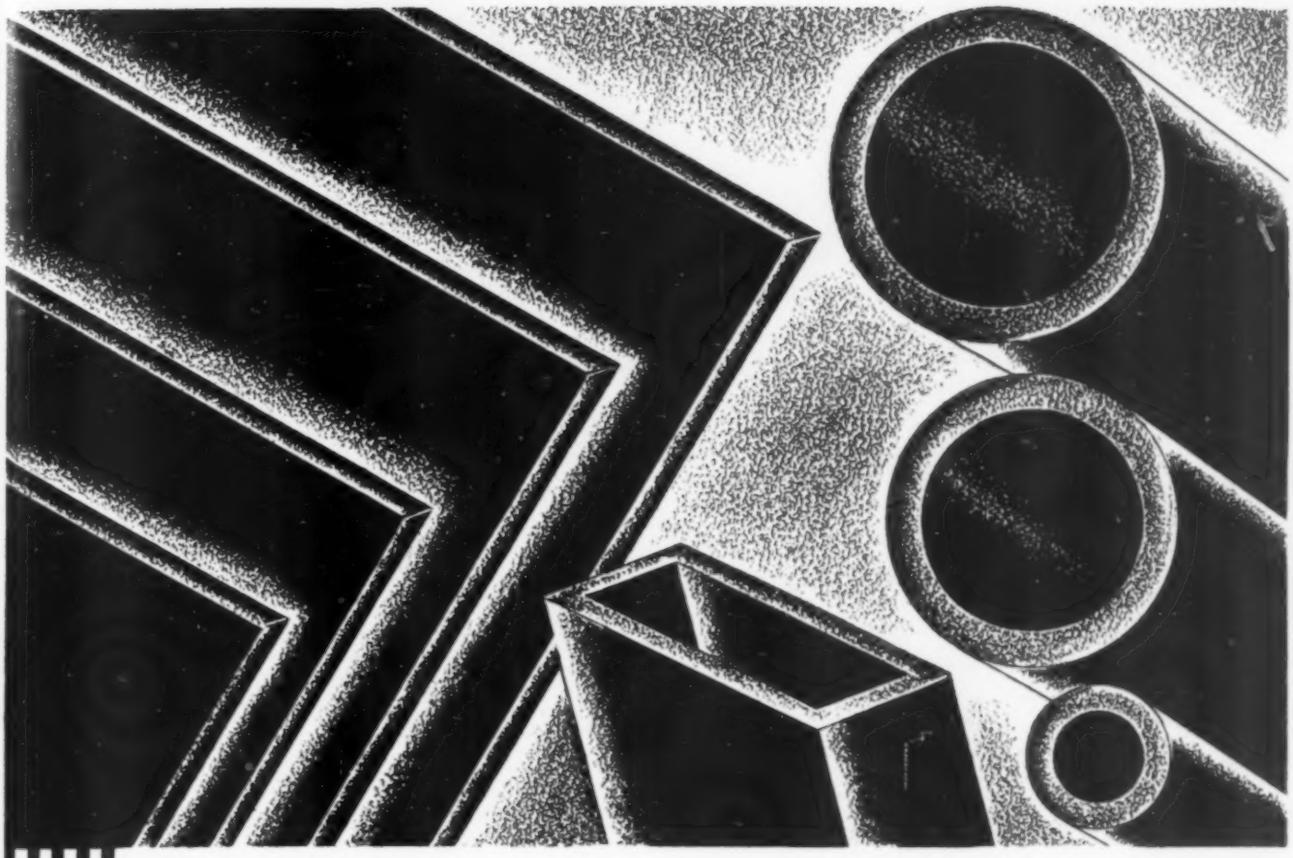
The Needle Pyrometer is provided with a sturdy, well-finished wooden carrying case, fitted with a lock and leather handle.

In using the Needle Pyrometer, the Immersion Element is held in one hand and the Indicator in the other. The needle is then thrust into the plastic material, the temperature of which is desired. The correct reading appears on the scale almost immediately.

In the plastics industry the Needle Pyrometer has demonstrated its usefulness on a number of operations, particularly in extruding and calendering. From time to time new applications are found for this instrument in this ever-widening field.

The Needle Pyrometer can be converted to a Surface Pyrometer by connecting the needle thermocouple to the terminals of a standard Surface Pyrometer. It can then be used to determine the surface temperatures of moving hot rolls and similar machine parts.

It may likewise be combined with a Mold Pyrometer, in which case the Immersion and Mold Elements are connected interchangeably to the same indicator.



TO THE PLASTIC TRADES
WHERE BLACKS ARE...

BLACK

FOR
THERMO PLASTICS

THERMO CURING
PLASTICS

MOLDING POWDERS

LAMINATING
VARNISHES

CASTING RESINS

SEE

Calco

FOR CONDENSATION
BLACKS
TRUE TO THEIR PURPOSE

THE
CALCO CHEMICAL COMPANY
INCORPORATED
BOUND BROOK - NEW JERSEY
BOSTON - PHILADELPHIA - NEW YORK
CHARLOTTE - CHICAGO

A Unit of
American
Cyanamid Company

PLASTIC CONSULTANTS

Announcement is made of the formation of a new firm, Walker & Gilmore, with an office at 30 Church St., New York, N. Y. George Walker and R. C. Gilmore, Jr., are partners in the enterprise which is to specialize in plastic products, with specific attention to product development, research and consulting.

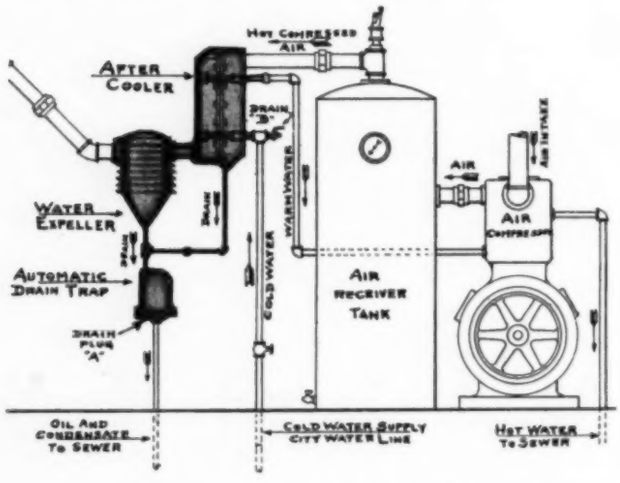
Both principals are well known in the plastic industry, Mr. Walker having been connected with the Garfield Manufacturing Co., molders, for over sixteen years, the last half of this as sales manager. Mr. Gilmore was president and general manager of Plastic Publications, Inc., from 1928 to August of this year.

Manuel R. Ximenez is in charge of all research and technical activities, the firm having established laboratories in Plainfield, N. J. Mr. Ximenez, a chemical engineer, has recently been active as a consultant on plastics and during his many years with the Celluloid Corp. he was at various times in charge of the chemical, testing, molding and laminating laboratories.

Clients of the firm include many users of various forms of plastics who are being advised on the proper selection of material and for whom Walker & Gilmore will work in the development of new applications.

COMPRESSED AIR-DRYING SYSTEM

Moisture and oil in the compressed air supply are the cause of many operating troubles in pneumatically operated equipment. Moisture is naturally present in all atmospheric or "free air," the water content varying with the humidity. This moisture condition is still further aggravated by the higher temperatures and humidity during the summer months.



The quantity of moisture in one cubic foot of compressed air at 100 pounds gage pressure is $7\frac{1}{2}$ times the quantity of moisture in one cubic foot of free air at atmospheric pressure. On account of the high heat of compression (450 to 500° in single stage compression), this moisture is held in suspension in the form of a gas or hot vapor and is not released until its temperature is again reduced to the atmospheric temperature.

This super-heated compressed air gradually loses its heat as it travels along the pipe lines and the moisture thus released settles in the pipes and low points so that water is discharged from all available outlets.

The most practical method known for the removal of moisture and oil from compressed air, according to the Ruemelin Mfg. Co., is to thoroughly cool the air to a condensation temperature. Cooling the air removes the heat caused by compression so that the entrained moisture, which is carried in the form of a vapor, is precipitated.

The high efficiency of Ruemelin aftercoolers is achieved by effective water cooling in combination with the application of several important scientific principles for rapid heat exchange.

The water of condensation is precipitated as the air flows through the cooler. The moisture which is in the form of a fine mist or fog is centrifugally extracted by the Ruemelin expeller.

The condensate from both the cooler and expeller is automatically discharged from the system by a drain trap as shown in an accompanying illustration.

During the Centenary celebration of the University of Brussels, Brussels, Belgium, observed this month, Dr. Leo Hendrik Baekeland, inventor of Bakelite resinoid, was bestowed with the honorary degree of Doctor of Applied Sciences. Doctor Baekeland, who was born in Ghent in 1863, spent his early years studying and teaching science and chemistry in Belgian Universities. He came to the United States in 1889. Among his many inventions was Velox photographic paper. In 1905 he became instrumental in the development of the Townsend electrolytic cell for the Hooker Electro-Chemical Company.

Perhaps best known of all (*Continued on page 53*)

PRACTICAL EVERYDAY CHEMISTRY

contains hundreds of priceless recipes and formulae . . . more than three hundred pages in all. Whether you need its information in your daily work or merely dabble in chemistry . . . you will find this, the only book of its kind, a priceless treasure for ready reference. Within its pages you will find the answers to all those questions which daily arise . . . answers that may mean hundreds, thousands of dollars to you.

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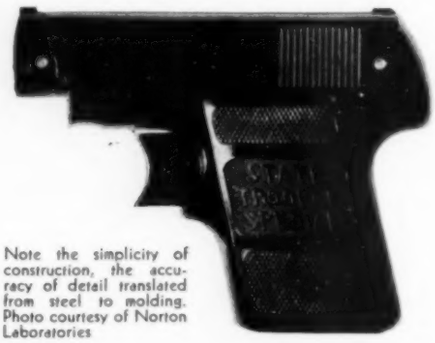
THE GUN THAT "GOT DILLINGER" GETS THE SALES

ADULTS like to speak learnedly about "Childish fancy." Maiden aunts, old enough to have forgotten their own childhoods, delight in purchasing whimsical French dolls for their nieces and "educational" chemical sets for their nephews, mistaking their own sophistication for an understanding of the eight-year-old's "imaginative whimsey."

Yet every one who has ever had any close dealing with children knows that "childish fancy" is rooted in a very practical realism. Little Tommy can transform himself into Tom Mix quite simply if supplied with a pair of chaps. Little Mary becomes a little mother when she owns a "real-talking-baby-doll."

Perhaps, in this practical base upon which children's imaginations work, there is the greatest reason for the instant sales success of the State Trooper Automatic Repeating Pistol, designed and molded by Norton Laboratories. For the State Trooper is no sissified imitation of the real thing—no Dillinger's wooden gun. In every detail of its gleaming black surface it reproduces, to perfection, the appearance and the feel of a real automatic. Loaded with six match sticks, it projects them, in rapid succesion a distance of fifty feet. Its trigger, like the case molded in black, responds instantly to finger pressure; its sights, molded as integral parts of the two piece barrel, insure a bull's eye at forty paces.

No wonder, then, amidst the welter of intricate and so-called imaginative toys, that youngsters' eyes, by the thousands, have been lighting upon this inexpensive toy, preferring it to articles and games priced ten and twenty times as high. For here, in a molding as simple and clever as it is indestructible, is a firm base of reality, from which imagination can take flight. Ella May Boole won't like this incentive to gangsterism (in spite of its State Trooper trade mark) but a million kids have shown, unmistakably, that it is a toy that *is* a toy!



Note the simplicity of construction, the accuracy of detail translated from steel to molding. Photo courtesy of Norton Laboratories

Artificial sponges and like porous molded products are efficiently and economically formed from a suitable viscose composition by being extruded through a tube which is cold at the inlet end but is progressively heated toward the outlet end. Thus, as the viscose composition moves through the tube coagulation sets in and the material emerges from the heated end as a spongy material which can be cut off as desired. (I. G. Farbenindustrie Aktiengesellschaft, German Patent 594,437.)

Ear trumpets and like molded products can be successfully made from urea-formaldehyde resins, in black or other color effects, by using a relatively inexpensive blend of urea-formaldehyde resins with casein plastics. By proper homogenizing of the ingredients and by suitable manipulation a light, porous product is obtained which is especially useful for ear trumpets but which also has many other possible uses. (Fritz Schmidt, German Patent 591,045).

MODERN PLASTICS SPONSORS FIRST ANNUAL PLASTICS EXHIBIT

(*Continued from page 25*) (the first week of the showing) than, in all likelihood, in any month before. Literally by the hundreds, executives of major industrial corporations have come to view what promised to be merely another interesting show. They have stayed to marvel, to ask pointed questions about methods, designs, application and costs, to place live inquiries as to materials, fabricators and molders able to produce *their* products. The list of visitors includes architects, designers and executives of companies whose products range from packages to radios, from cosmetics to toasters, from telephones to printing presses.

Among the leaders in the plastic field sponsoring exhibits are: American Insulator Corporation, American Record Corporation, American Catalin Corporation, Auburn Button Works, Inc., Bakelite Corporation, Beetleware Corporation, Boonton Molding Co., Celluloid Corporation, The Cambridge Instrument Co., Chicago Molded Products Corporation, Continental Diamond Fibre Co., Formica Insulation Co., Gemloid Corporation, General Plastics, Inc., General Electric Co., Kuhn & Jacob Moulding & Tool Co., The Kurz-Kasch Co., National Vulcanized Fibre Co., Northern Industrial Chemical Co., Norton Laboratories, Inc., Panelyte Corporation, Resinox Corporation, Reynolds Spring Co., The Richardson Company, The Siemon Co., Tech-Art Plastics Co., Tennessee Eastman Corporation and Toledo Synthetic Products, Inc.

The exhibit will continue through the twenty-second of December. For those who have not yet made their visit, the address is 425 Fourth Avenue, New York, the hours from nine-thirty to five on weekdays and nine-thirty to one on Saturdays.

PRODUCED BY BOONTON • MASTER MOLDERS OF PLASTICS

Molded Controller Case for C. J. TAGLIABUE Mfg. Co.

ABSOLUTE accuracy in molding is called for on a job like this TAG Snapon Controller for refrigerators. There are eight molded pieces in this compact assembly, which must fit together like a charm. The Bakelite case and covers hold eight metal inserts, which must be perfectly placed. ★ ★ These demands are expertly met by Boonton, and to Tagliabue goes a smooth flow of quality parts. This same experienced molding service and engineering counsel are at your disposal.

BOONTON
MOLDING COMPANY
BOONTON • NEW JERSEY
Master Molders of Plastics
Phenolics, Urea and Cellulose Acetates

The extreme toughness and shock resistance of cellulose acetate are important safety factors inducing its use on these protective goggles. The transparency of the material, which permits partial vision through the frame, is likewise an important factor. Note that the cups are punched and sawed after molding. Molding by Shaw Insulator Co. Photo courtesy of Tennessee Eastman Corp.

WHICH PLASTICS TO CHOOSE? IV

This is the fourth in a series of articles describing the various plastics and telling about their applications. Previous articles dealt, respectively, with the phenolic and urea types of molding plastics and the cast phenolics. Succeeding articles will deal with other types of plastics, each of which has important industrial applications

CELLULOSE ACETATE—WHEREIN BEAUTY AND TOUGHNESS ARE COMBINED

by Herbert Chase, M.E.

AMONG all plastic materials, there are none more beautiful than those classified as cellulose acetate. They are sold under the much more attractive names of Lumarith, Masuron and Tenite by different makers. This applies to molding compounds primarily, but these and several other makes are marketed under the same and different names in the form of sheets, rods and tubes. Our present purpose, however, is to deal with cellulose acetate molding powders, but it may be noted in passing that such items as watch crystals, some toothbrush handles and certain other products are molded from sheet stock handled in much the same way as are the molding powders.

Almost everybody knows what strikingly beautiful effects are secured with such nitro-cellulose products as Celluloid and Pyralin. Virtually all of these can be du-

Ameroid

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- Made in beautifully mottled and plain colors

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Methyl Ethyl Ketone
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Butyl Acetate, Nor. & Sec.
Butyl Alcohol, Nor. & Sec.
Amyl Acetate: Standard, High Test, Secondary, and Special Grades
Amyl Alcohol
Refined Fusel Oil
Butyl Propionate
Butyl Stearate
Phthalates:
Dimethyl Dibutyl
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Acetine
Diacetine Triacetine

The Kessler Chemical Corporation has always confined its manufacture to solvents and plasticizers and is not offering lacquer or intermediate products.

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PHTHALATES—STEARATES—TRIACETINE

we are producing special products to meet these needs. Our technical and manufacturing experience may solve your problem: we offer our cooperation.

K 403

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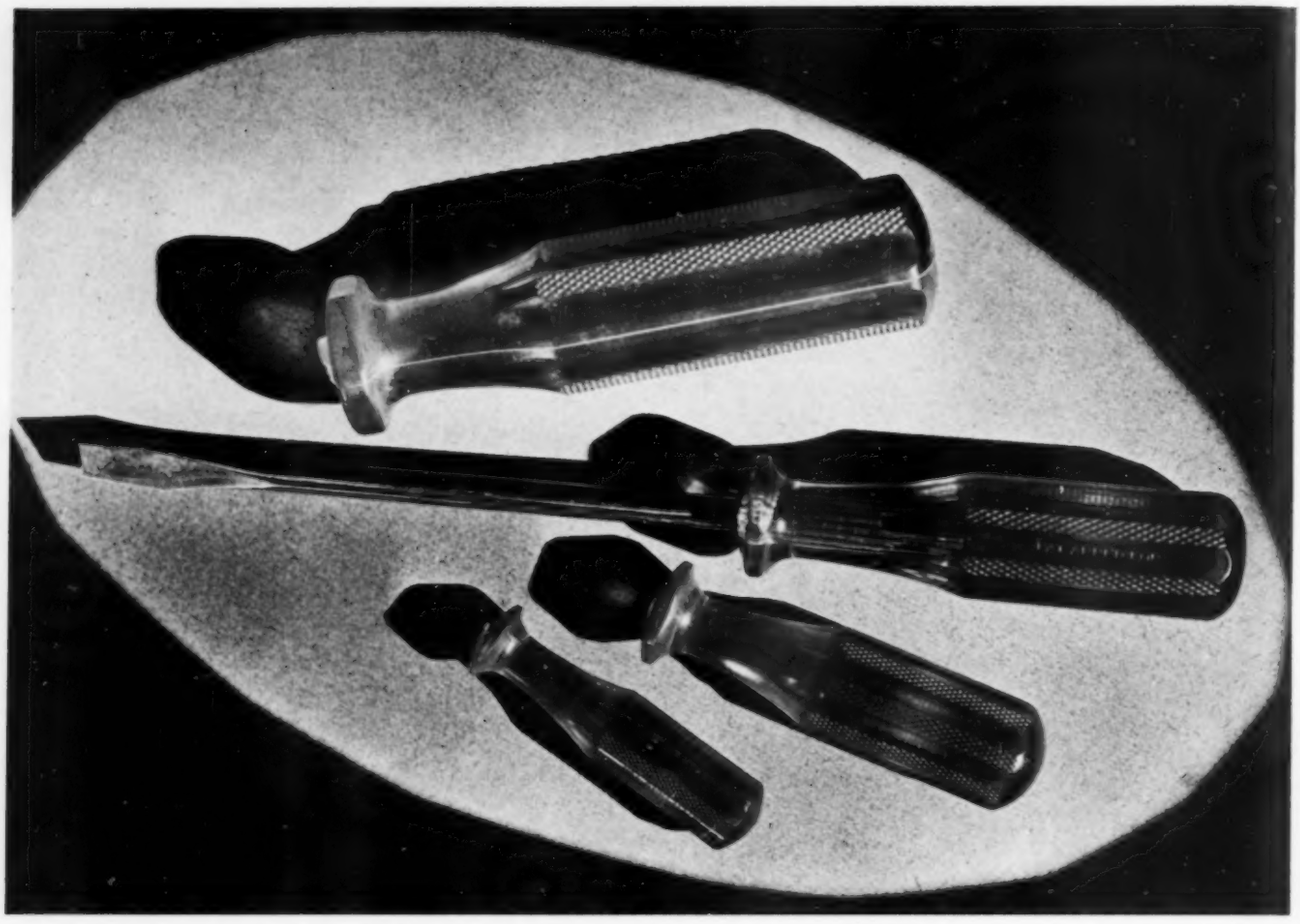

Screwdrivers with handles of Lumarith. Such handles are very excellent dielectrics (insulators), have a fine appearance and will withstand sharp blows without chipping or cracking.—Courtesy Celluloid Corp.

plicated in cellulose acetate, which ranges in color from pure water white to inky black and can be had in almost any shade and degree of transparency to complete opacity. Two or more colors are often combined and it is possible to duplicate many minerals and mineral structures such as onyx, marble, agate and clear crystals of many kinds, as well as wood grains, ivory, shell, ebony, pearl and many others, in appearance, although there are limitations in this respect when the materials are formed by molding from powders.

In these respects, cellulose acetate resembles the nitro-cellulose plastics, as it does also in physical properties, with certain exceptions. One of these exceptions is the rate of burning which is quite slow with cellulose acetate and very rapid under certain circumstances with nitro-cellulose. For this reason, cellulose acetate is often substituted for nitro-cellulose, especially when handled or stored in quantities or when used where flame or sparks might ignite more inflammable materials. The acetate is called substantially noninflammable and is used extensively in comminuted forms as molding powders or molding granules whereas the nitro-cellulose, though moldable, is rarely molded except from sheet or bar stock. However, the big field which exists for striated and grained variegations only buys material in blank or sheet form. An article molded from granules of different colors mixed together usually gives merely a "salt and pepper" effect.

Acetate in the form of granulation or molding sheet is lower priced than the nitro-cellulose. However, acetate sheets made by the usual nitro-cellulose process

PROPERTIES OF CELLULOSE ACETATE MOLDING MATERIAL

Specific gravity 1.27 to 1.56
Weight per cu. in., oz. 0.74 to 0.90
Cubic inches per lb. 17.8 to 21.9
Tensile strength, lb. per sq. in. 2,800 to 5,000
Transverse strength, lb. per sq. in. 6,000 to 7,000
Impact strength, Charpy, ft. lb. 2.2 to 3.2
Dielectric strength, volts per mil at 60 cycles 470 to 800
Dielectric constant, 550 cycles 4.3 to 4.9
Water absorption in 24-hr. immersion, per cent 1.4 to 1.7
Softening temperature, deg. F. 140 to 180
Volume of molding compound to vol. of molded piece 2.2–2.5 to 1 in.
Molding temperature, deg. F. 275 to 320
Molding pressure, lb. per sq. in. 2,000 to 3,000

Note: The properties given are as furnished by makers and vary to some extent with the grade and type of material employed, hence the range in properties given is rather wide in certain instances.

Cellulose acetate is not affected by some vegetable or mineral oils but is spotted by alcohol. Certain ketones and acetates are solvents. Strong acids or alkalis decompose the material.

WHY NOT INVESTIGATE

and see what

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Had it not been for MAKALOT there would have been a number of failures where many thousands of dollars had been expended in building costly dies only to find that the materials they had expected to use would not work. It was necessary to come to MAKALOT for a material to make

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High Heat #75-D — All Mineral Filler
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Note the new, improved 5½ Tablet Machine shown at right. The solid steel frame insures perfect operation; the improved die fasteners, improved cam construction, heavier ejecting arm brackets and vanadium steel plunger make possible high speeds without fear of breakdown or lowered quality. In every particular, we believe, this machine is by far the finest the market has to offer.

The 5½ Tablet Machine makes tablets up to 3″ in diameter and having a fill depth of 2⅛″. Other Colton Preforming Machines—single punch, multiple and rotary—are likewise outstanding in construction and performance. Write for literature on these machines or have our engineers visit your plant—

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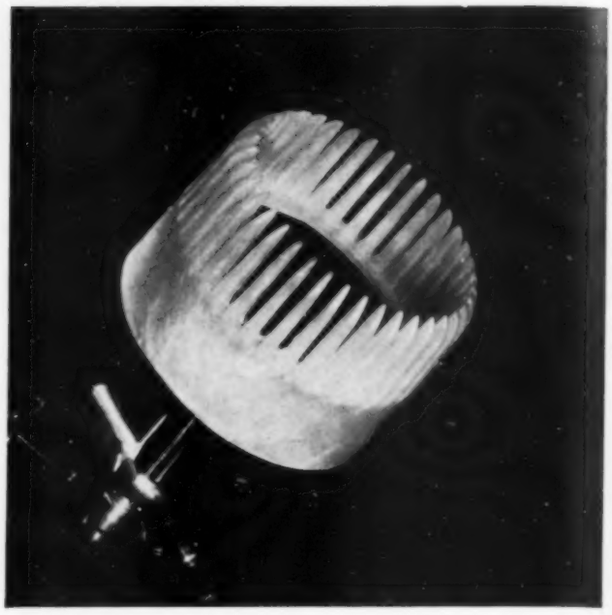
DETROIT, MICHIGAN

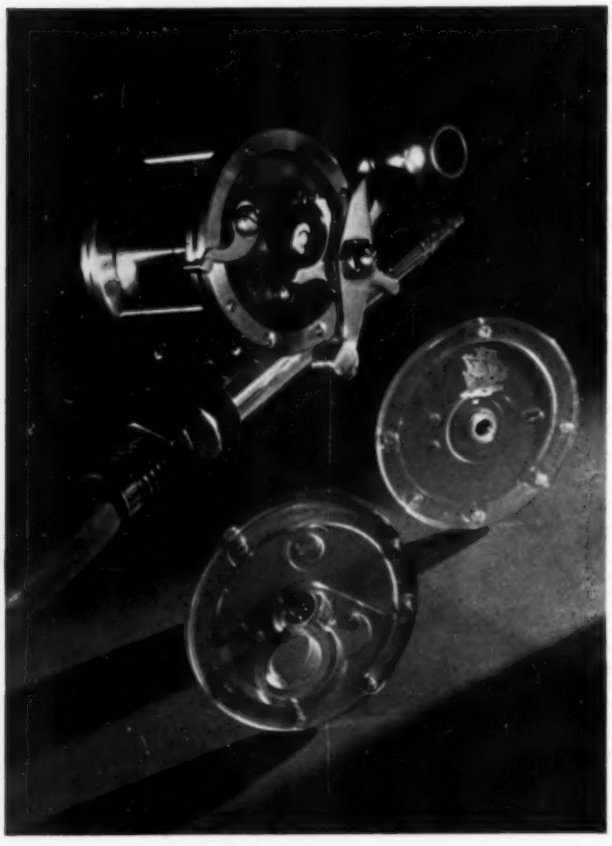
COLTON DETROIT

Cellulose acetate is extensively used for vibrator, massage and dressing combs because of its resiliency, smoothness, beautiful colors and low fire hazard. Molding by Shaw Insulator Co. Photo courtesy of Tennessee Eastman Corp.



(not for molding) are from ten to fifteen per cent higher than nitrate sheets made in the same way. The acetate molding compositions are high in price compared with any other molding composition; that is, the phenol and urea materials. It is used chiefly: (1) where color effects not otherwise obtainable (except in the nitrate) are desired; (2) where its toughness (lack of brittleness) is desired; (3) where it takes the place of nitrate because of relative non-inflammability and because it is not rendered brittle by aging, especially under light exposure; (4) where ultra-violet light must be transmitted; (5) where its excellent dielectric qualities are desired; (6) where molding by the injection method presents advantages, and (7) in certain other cases where the combination of properties of some one of them makes it the best material available to meet particular conditions.

Cellulose acetate is light, yet mechanically strong and is not easily broken by a sharp blow or fall. This and its non-scratching characteristic accounts for its use in phonograph records, as noted in the November issue of MODERN PLASTICS, and for some other applications. It is tasteless, sanitary, practically odorless, non-corrosive, impervious to oils, takes a high polish and can be had in several degrees of hardness to meet various needs. It is readily cemented to itself and is sometimes combined with other plastics or with metals to excellent advantage. Some of its physical properties are listed in an accompanying table. Transparent and translucent forms are made either white or are tinted with dyes. The opaque forms are pigmented and weigh a little more than the transparent forms.



Cellulose acetate is not a thermo-setting compound which changes chemically and permanently when molded. It is a thermo-plastic substance which holds its shape well when molded, but can be softened by reheating and remolded if desired.

However, after molding in a heated mold, the latter must be cooled before the molding can be ejected, as it will remain soft as long as it remains heated. This slows the molding cycle and involves the use of water in cooling and of extra steam in heating under the usual molding conditions. However, molds have recently been designed giving an even shorter cycle than would be required for the time necessary to cure the same phenol formaldehyde piece. In addition, there is a limit in the temperature at which an acetate piece can be used without softening, though in most applications this temperature is so high that it is never reached in service and hence is of no moment.

Cellulose acetate is excellent for such products as combs, fountain pen and pencil barrels, decorative automotive and other hardware parts, tool, brush and other handles not subjected to high temperatures, frames for magnifying glasses, for the cases of hearing devices and similar instruments, for some electrical parts where fine appearance and/or special properties are desired and for almost any molded article in which a less expensive material will not meet such requirements as appearance, toughness, water absorption or the like.

Fishing reel ends are molded of cellulose acetate because of the durability and high-shock-resistance of the material. The ability to take metal inserts is also an important factor. Molded by Reynolds Spry Co. Photo courtesy of Tennessee Eastman Corp.

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These products meet the most exacting requirements. They have the purity and uniform strength so vital in the production of Plastic materials of dependable, uniform quality.

Group of articles made by the injection molding process from cellulose acetate by F. A. Hughes & Co., Ltd., London, England. At the right are shown two tapered pen caps attached to the "gate" or "sprue," these being two of the six which are formed simultaneously in a six-cavity mold. The process is very rapid and lends itself to production of large quantities of small parts at a high rate and low cost

In most molding work, cellulose acetate is handled in much the same way as other molding compounds and is formed in the same or very similar molds. The compound is placed in a heated cavity and when softened sufficiently the mold is closed, subjecting the charge to a heavy pressure and causing it to flow into every part of the cavity. When this occurs, the steam is turned off and water admitted to cool the mold or the latter, in the case of hand molds, is placed in a cold press until the molded piece hardens. Then the mold is opened and the piece is ejected, as in other forms of molding. There is no delay for the curing required in thermosetting materials but the cooling and reheating of the mold may take as long or longer so that there is little or no gain in production rate.

This applies to the normal method of molding, but not to a newer method, termed "injection" molding, which promises great advantages for certain classes of product and is so used already in some instances. This process involves heating the cellulose acetate charge outside the mold and, when it is soft, forcing it or a part of it into the mold cavities as a semi-liquid or plastic mass. This has the great advantage that, since the mold can be kept cold, the piece "freezes" or hardens almost instantly, hence the mold can be opened and the piece or pieces ejected almost immediately. As a result, molding can be done with great rapidity, and since the labor charge per piece is low it is possible, especially with small pieces, to produce them almost if not quite as cheaply as if a much less expensive molding material and conventional molding methods were used.

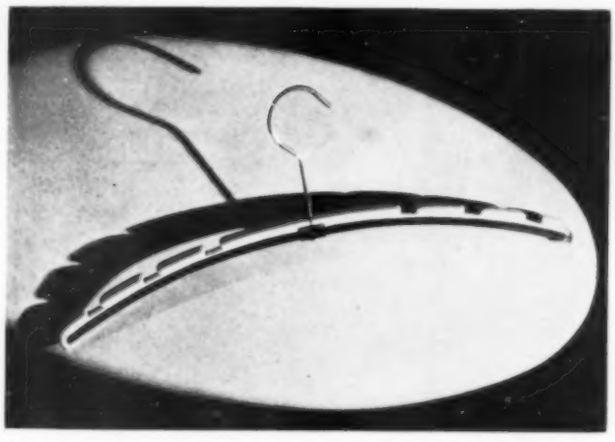
Thus far, the injection molding process has been applied chiefly to small articles such as fountain pen parts, small containers, shaving brush handles, buttons, buckles, tube or bottle caps, salt shaker covers and like items. It is possible to form parts with threads, and production rates as high as 3600 small pieces an hour

Shaving brush handles produced by injection molding. Such parts are molded, with the thread, at a rapid rate. In this case, a metal insert which adds some weight is used as an insert. The brush handle at the left is a plain opaque color. That at the right, molded from chips of different colors, is mottled

are reported attained from molds having six cavities. This requires, of course, a machine especially designed for the purpose. Several such machines have been built, some in this country under different patents and some in England and Germany where the machines appear to be more widely employed than here.

A form of injection molding (sometimes called transfer molding) can be done also with an ordinary molding press having a special piston and cylinder. The Shaw Insulator Company and the Norton Laboratories have done similar work with conventional presses and other molders have at least experimented along the same lines. The Norton Laboratories produced the pocket magnifier casing used by Bausch & Lomb and pictured on page 13 of the October number of MODERN PLASTICS by this method.

By the use of cellulose acetate molding compounds containing granules of two or more colors it is possible to produce mottled and grained effects, either by the conventional form of molding or by injection molding, but many of the beautiful effects produced in sheet and tube stock for pens and other purposes cannot be duplicated by molding, even when the same basic type of material is used, because the flow of the material



Cellulose acetate is here attached to plated metal to form an attractive, colorful and more protective type of dress hanger. Note the slots to prevent the garment slipping off the hanger. Molded by Mack Molding Co., Photo courtesy of Tennessee Eastman Corp.

in the mold changes the figuration. Largely for this reason, molding is done in general either with a plain color or with some combination of colors which will produce a satisfactory mottled or grained effect. Although such effects are admired by some classes of purchasers, they are, in general, frowned upon by artists who recommend, as a rule, solid colors which are characteristic of the material and not an attempt to simulate some other material.

Recent reports from Detroit are to the effect that some makers of automobile hardware are experimenting with cellulose acetate as a molded covering for die-cast metal parts. This process is presumed to involve placing the insert in a mold and then molding a thin

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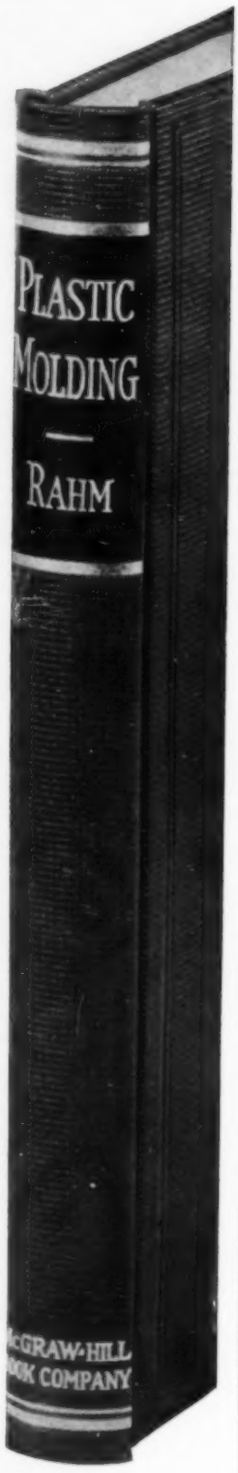
Plastic Molding

by **LOUIS F. RAHM**

Assistant Professor of Mechanical Engineering, Princeton University

246 pages, 6 x 9, illustrated, $3.00



THIS book describes the molding process and the characteristics of plastic materials. It takes up in detail the types and uses of molds, their style, general design details, the hobbing process. Then it gives definite information on operating equipment and discusses the selection of equipment and the layout of the molding plant. It includes careful suggestions on maintenance and operation of equipment.

If you are a manufacturer, you will get from this book help on all sorts of plastic molding problems. You will secure a manual of best methods.

If you are a user of plastic products, you will get from this book priceless suggestions for the more efficient selection and adaptation of these products.

The author has had wide practical experience through his connection with Du Pont Viscoloid Company and the Burroughs Company. Under the Robert Stewart Brooks Fellowship at Princeton, he made a survey of the methods and equipment of the leading molding plants in the country. His book is an authoritative manual for the entire plastic molding industry—the first to be devoted exclusively to molding processes, equipment and methods.

CONTENTS:

I—The Molding Process and the Plastics.
The Molding Process. The Plastics.

II—Molds.
Types and Uses. Style. General Design Details. Special Details. Die Hobbing.

III—Operating Equipment.
Molding Presses. Accessory Equipment.

IV—The Molding Plant.
Plant Equipment.

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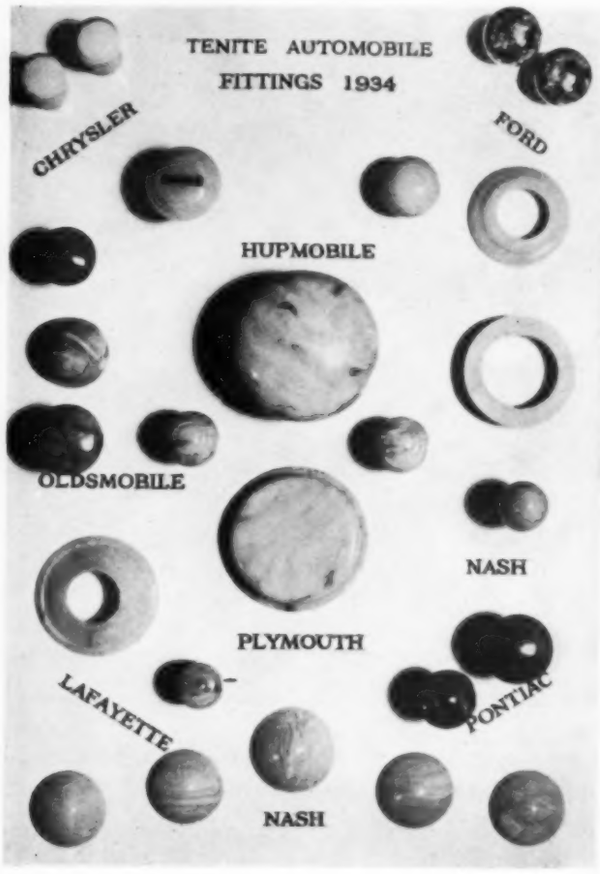
coating of the acetate around it, but specific information in this regard has not been released as yet. It is known to be possible to mold acetate around a metal core, and, if such a product proves successful and meets the public fancy, it may result in a new vogue in automotive hardware. The metal core in a product of this kind strengthens the piece and reduces the quantity of acetate required as compared to a solid acetate product.

Future use of cellulose acetate for molding purposes is believed to be bound up to a considerable extent with the development of injection molding or perhaps with developments that will make the material available at a lower price. Both of these would tend, of course, to lower the cost of the finished product.

From the foregoing it will be seen that the designer has in cellulose acetate a strong, light and very beautiful material from which a wide range of objects can be produced. The material has qualities which are not combined in any other plastic and it fits into many applications where these qualities are desirable. It can be had in several grades and the user would do well to consult with the molder and the producer of the material to be selected before deciding on a particular application, as this will insure better results than may be obtained otherwise.



Knobs and fittings of wide variety have come into extensive use on automobiles in every price range. Note the variety of shapes easily molded. Photo courtesy of Tennessee Eastman Corp.

NEWS AND DEVELOPMENTS

(*Continued from page 40*) his inventions is Bakelite resinoid which he discovered in 1907. The following years, through extensive study and research, brought forth countless uses and applications for this resinoid. This research is still being carried on by the skilled staff of chemists and engineers of the Bakelite Corporation of which Doctor Baekeland is president.

The Northern Industrial Chemical Company, Boston. Massachusetts, has issued a "Beetleware" catalog. This describes the many uses for "Beetleware" and the items obtainable both in combination sets and individual pieces. Colors available in stock are red, green, orange and yellow.

The board of directors of General Electric Co., at its meeting in New York November 23, declared the 149th dividend on common stock and the 49th dividend on special stock, payable to stockholders of record on December 28, 1934. The dividends on both common and special stock of 15 cents a share are to be paid on January 25, 1935.

The introduction of Bakelite Synthetic Resins and their acceptance by the paint and varnish industry in the manufacture of more durable finishes has been responsible in no small degree for the great progress which has been made in the paint and varnish industry within recent years.

The new booklet, "Integrity of Finishes," recently published by Bakelite Corporation emphasizes particularly these qualities and characteristics of Bakelite Synthetic Resins which impart integrity to a paint product—resistance to sunlight and weathering, moisture resistance, chemical resistance, elasticity and its retention, and toughness. The booklet attempts to apply these factors of integrity to house paints, marine finishes, railway coatings, floor varnishes, furniture varnishes, anti-corrosive primers and finishing coats, and industrial baking finishes. It should be valuable to all persons interested in solving troublesome finishing and maintenance problems. Free copies are available.

"Industrial Cable," a new publication of the General Electric Company, Schenectady, N. Y., describes and lists all standard types of insulated wire and cable used by industrials for transmission, distribution and control, and used on or with electric equipment such as mining machinery, locomotives, arc welders, neon signs, etc.

The Paterson Foundry and Machine Co. has issued a comprehensive catalog describing the ball, tube and rod mills which it manufactures and detailing their use in the preparation of synthetic plastics and kindred products. The booklet contains full descriptions and specifications of the various types of dry and wet grinding mills and full instructions in their use. Copies are available on request.

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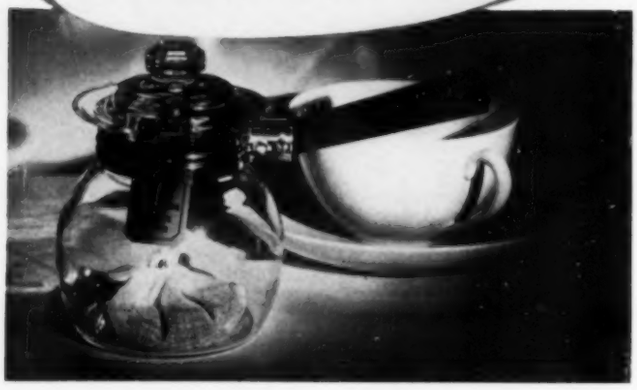

Take your cue from the Corning Glass Works, whose Pyrex dishware enjoys unique consumer and dealer acceptance. Corning goes beyond the mere decision to use molded plastics. They carry their plans to the logical conclusion . . . choose their molder as carefully as they do their materials. They put Diemolding under a microscope before we made the handle shown above—and we liked it that way. Our plant, our record, our personnel—all three are open to your severest inspection, because they are the type that can stand inspection. Put your dogs on us . . . we like it!

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WESTINGHOUSE will close its now internationally famous Home of Tomorrow to the public December 2, pending its reopening as a Home Economics Institute, according to A. E. Allen, vice-president. Approximately 75,000 persons, representing some 47 states and 24 foreign countries have inspected the Home of Tomorrow since its opening February 21, 1934. Although its location in Mansfield left much to be desired in the way of accessibility, the innovations and electrical servants attracted this large number of people, and as a result many of its features are being incorporated in hundreds of homes now being built.

The Home of Tomorrow Institute will be opened February 1 for its work. Certain portions of the Home will be redecorated as it has already undergone in one year the wear one family would give a home in fifty years of normal living. In addition to certain redecoration plans the first floor, or basement, will be remodeled. The recreation room is to be made into a work room equipped with electric ranges and refrigerators so that training of home economists can be carried on under the supervision of Westinghouse home economists. Standard equipment will be put in the laundry so that classes can be held teaching the proper methods of washing and ironing clothes. Westinghouse major appliances of standard design will be used so that the home economists working with them will become acquainted with any equipment they use in the field.

In addition to the remodeling for home economic training, the storage rooms will be made into appliance display rooms so that the women can become familiar with the complete line of electrical appliances. The home economists participating in this venture will have the opportunity to work with the appliances and offer suggestions for the developments of new appliances that would be helpful to the housewife. The use of kitchen mixers, waffle irons, toasters and other small appliances will all be a part of the work given in this new Westinghouse pioneering venture, the first of its kind in the country—the Home of Tomorrow Institute.

S. A. Pellerano, formerly chief chemist of the Garfield Mfg. Co., of Garfield, N. J., and A. J. Rissetto, formerly with Zonite Products Corporation, have entered in business as consulting chemists and chemical engineers under the firm name of Associated Industrial Chemists, 1918—71st Street, Brooklyn, N. Y., specializing in pharmaceuticals, synthetic resins and plastic compositions.

The Production Machine Company, Greenfield, Massachusetts, has purchased the entire business, good will, etc., of the Peerless Surfacing Machine Company, formerly of Troy, New York, and manufacturers of vertical and horizontal abrasive belt surfacing machines. The company plans to further improve and develop the line.

PLASTIC INDUSTRY'S OUTPUT REACHES HIGH FIGURE

SOME indication of the importance of the plastics industry can be gathered from data which indicate that the raw materials alone had a market value in 1933 in excess of twenty million dollars. In their final manufactured form, these raw materials had a value on which precise information is lacking but which undoubtedly is several times as great as that for the raw materials. Besides the plastics themselves, the plastics industry combines with its own products large quantities of other raw and manufactured materials, such as wood flour, asbestos, mica, paper, vegetable fibre, a great variety of pigments and dyes and many other ingredients, all of which swell the value of its own products.

In point of value, nitrocellulose plastics still outrank the other and newer plastics, but on a tonnage basis synthetic resins production far exceeds the pyroxylin type, which includes such materials as Celluloid, Pyralin, Fiberloid and many other similar products. There were twelve producers of pyroxylin plastics in 1933, and during that year they made for sale in forms for further manufacture, chiefly in sheets, rods and tubes, 10,085,046 lb. of nitrocellulose products, valued at $7,799,283. These figures are much lower than for 1931, the previous census year, when they reached 12,008,439 lb. valued at $11,113,618. In 1933 the pyroxylin plastic producers made and consumed in their own plants in the production of finished articles 2,849,523 lb., valuing the product at $4,303,765. If the latter figure be added to the value of the materials sold for further manufacture, the total value of the output of the producing plants was $12,103,048 as against $17,659,104 in 1931. These figures do not include photographic film, much of which is nitrocellulose, though some is cellulose acetate. It is apparent, however, that the pyroxylin producers have felt the effect of the competition of other plastics, as these have increased their output while that of nitrocellulose has fallen off. Some of the loss may be attributed to the wider use of the cast phenolic materials and some to the increasing use of cellulose acetate and vinyl plastics, among other materials.

Synthetic resins, from which the phenolic, urea and certain other plastics are made, were produced in 1933 in quantities exceeding 45 million pounds of which 34,916,046 lb. were sold for $8,983,662. Of the total production, over 25 million pounds were derived from phenol and about 6.5 million pounds from a source classified as "phenol and/or cresol" of which the large part is doubtless phenol, hence about two thirds of the total is probably in phenolic resins. Although a large proportion of these resins go into the manufacture of plastics, considerable quantities are used in making varnishes and other finishes.

Next to the phenolic synthetic resins, the phthalic anhydride type, of which nearly 10 million pounds were produced, is most important in point of tonnage. This

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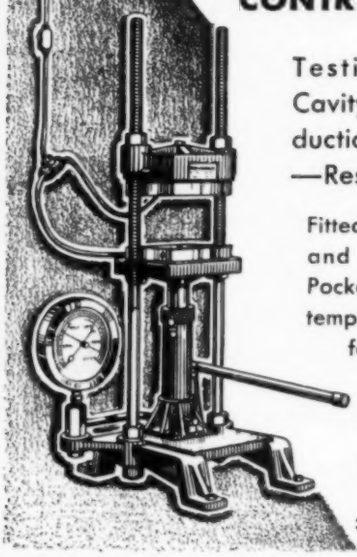

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343 Hudson St., New York

form of resin is not much used in plastics, however, though some Gylptal resins, which are of this type, are used in making some plastic materials.

Urea resins, including the thio-urea type, were made in quantities exceeding 3.2 million pounds.

Sales of synthetic resins in 1933 were distributed as follows, according to the Biennial Census of Manufactures:

Derived From	Sales in Pounds	Total Value	Average Price Per Lb.
Phenol	21,850,541	$5,382,721	24.6¢
Phenol and/or cresol	6,152,258	1,181,949	19.2
Phthalic anhydride	3,654,854	673,890	18.4
Urea or thiourea	2,977,791	1,422,671	47.8
All others	280,620	322,431	115.0

Since all phenolic and urea molding compounds, or virtually all, are a mixture of fillers and resins, usually in about equal parts, and the fillers are, in general, less expensive than the resins, the compounds cost much less per lb. than the resins themselves. When, as is usual, either a dye or a pigment is used to color the compound, its cost must be considered.

DESIGN PATENTS FOR PLASTICS

(*Continued from page 29*) contributory to the situation which is bringing mounting pressure for an annex to the design patent law. Plastic industry leaders have advanced the issue by their enterprise in developing original, individual and new designs for mechanisms, structures and articles of manufacture which though not decorative in an extreme sense are by no means destitute of characteristics of grace and aesthetic appeal. Even if the ornamental element be wholly lacking, it is claimed that the United States should take its cue from Canada (not to mention Germany and certain other nations) and protect articles of manufacture which may, and often do, involve originality and invention.

DECORATIVE LAMINATED PLASTICS

(*Continued from page 23*) the most delicate pastels to the rich refined value of a dark bronze. And then see what results are obtained!

Today, laminated plastic is made in $^1/_{16}$ in. thickness for veneering to plyboard to make table, counter and bar tops. It is also used in $^1/_{16}$ in. to $^1/_8$ in. thickness with a special backing to cement to plaster walls, thereby covering the monotonous old plaster finishes and modernizing the commonplace treatment. It is made up to $^1/_4$ in. in thickness for self-supporting panels, counter tops and partitions. It is also molded at the factory to the surfaces of presswood, asbestos and metallic cores. The asbestos and plymetal laminated plastics are utilized plain and also inlaid for storefronts and signs.

It is a fact that laminated plastics are absolutely alcohol-proof and not affected by dilute acids and alkalis. Also highly fire-proof thereby eliminating the hazard of burning cigarettes and minor conflagrations. The bar, soda fountain and restaurant fabricators have

found these characteristics together with the design effects most suitable for their service.

Similarly, laminated plastics do not chip like glass, are infinitely more durable than wood and wood finishes, and are not limited in color as metal nor do they present the cold shock to the touch so common to metal or objects that make use of metal.

The storefront and sign people have decided the necessity of a front modernization plan in keeping with the times. One of the greatest changes in the storefront practice is that of the Great A. & P. Tea Company. The old red front is rapidly disappearing in favor of the modern treatment. Such a sign is generally considered a vast improvement over the old appliqued metal letters which tarnish and collect dirt. The laminated plastic inlaid sign costs no more than the average appliqued metal letters on an equivalent background.

The visibility of a laminated inlaid sign having the No. 0 plain anodic aluminum letters molded flush into the surface of the gleaming jet black laminated surface has a visibility that is seldom equalled. The visibility is greater than that of silver and the anodic treatment eliminates tarnishing even to the extent of hundreds of hours submersion in salt water.

Laminated plastic is not a "cure-all." It is sometimes made translucent but would make a poor window in so far as visibility is concerned. It is harder than glass but would make a poor showing as a solitaire. It is not a cheap material such as you would use for a boardwalk or a "whiffle tree" to which to hitch the old grey mare. However, it probably would be ultimately economical for these applications were durability to be considered.

The most intricate of murals have been made. One of these represents the artist's conception in colored metallic inlay upon a various colored laminated surface of the source of supply of foods vended over a soda fountain counter, in a Pittsburgh department store. This store also features modern inlaid laminated table tops installed upon aluminum frames. The wainscot and booth partitions are of an Allegheny blue-green laminated plastic inlaid with an accent design in scintillating anodic aluminum. Such intricateness of inlay design as portrayed by these murals is expensive in a one-piece hand-cut job but were executed as an example of the possibilities should the quantities warrant tooling for the work.

SUCCESS STORIES

(*Continued from page 27*) nished initially with each camera. There are, in addition, eight small stampings, three of which form the shutter, two are spring parts for fastening the two halves of the body together, and the remainder are used in the film-winding mechanism. Four small rivets are used in assembly and there is a wire shutter spring, a lens, a paper washer for holding the lens in place and a small circle of ruby celluloid for the window through which the film spacing is observed.

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As an engineering design for low-cost production, the camera is a real achievement for which credit is due to Mr. R. Rochester who conceived the idea, did the design work, supervised the production of the molds and the cameras themselves, took care of the selling of the product to the Woolworth chain, designed the machines for making the rolls of film and in fact had charge of the entire project.

Molded parts are produced from phenolic material which has to be low in phenol content to avoid discoloration of the film. The camera measures approximately $1^{7}/_{8}$ by $3^{7}/_{8}$ by $1^{1}/_{2}$ in. in overall dimensions. The section thickness is about $^{1}/_{16}$ in. in most parts but, where strength and other factors require, is increased to $^{1}/_{8}$ and in some parts to $^{1}/_{4}$ or $^{5}/_{16}$ in. At other points, sections only $^{1}/_{32}$ in. thick are used. Openings for the lens, window and finder are cored, of course, and projecting integral nibs are provided for positioning the shutter and preventing back-wind on the film. The hole through which the winding stem passes is so placed that it has to be drilled, but this is a very simple operation. A neat molded enclosure for the shutter is provided and there is an ingenious spring arrangement inside the molded winding knob to prevent back-wind. A simple molding with a slot in one end to mate with the winding key forms the film spool, the latter being held by a short piece of adhesive material wrapped around the stem.

Manufacture and Materials:

Production of the front and rear halves, forming the major parts of the camera, is done in six-cavity molds, that for the back being a flash type and that for the front a positive mold. These molds are so designed that 2500 pairs of molded parts can be produced during each 24-hour run. A higher production rate on the smaller parts is readily attained. Over 250,000 complete cameras were delivered within six months after production was started. So reads the record!

All five of the plastic parts are produced by Tech-Art and delivered to Rocamco Products, Inc., at a price reported to be below six cents per set! It is extremely unlikely that a similar result could be obtained by any other method than molding or with any other material than a plastic such as that employed. So well has the design been worked out, that assembly is said to cost less than one cent per camera. Cost considerations precluded the use of a ground lens, but the problem was solved by molding the lenses from glass in highly polished molds.

Sales Success:

Sales, as previously indicated, have exceeded 250,000 cameras and about five rolls of film per camera, on an average, have been sold to date. This is regarded as a highly successful project, especially as marketing has

been confined thus far to a single chain and capacity production for the camera-selling season was attained. Despite this success, the producers are not satisfied to rest on their oars, but are planning the production of a revised design in which the camera will be made folding so as to occupy still less space in the pocket. The new design will also permit of a greater focal length for the lens and will insure an even better picture than the present design affords. An interesting side light on sales is the reported use of the present camera by news photographers and reporters, many of whom are said to employ the camera because of its compactness and the fact that it can often be used without attracting attention where a larger camera would be taboo. In any event, the camera is a remarkable example of what can be accomplished with plastics at a remarkably low cost when these materials are applied by a competent designer with a knowledge of the ways in which such materials are handled to best advantage.

DOOR KNOBS

(*Continued from page 22*) Finally, they are competitive in cost with any of the current types of knobs.

Although hundreds of thousands of molded plastic knobs have already been placed in service, mostly for replacement work, they have not been adopted by any of the old established hardware manufacturers. The reason is obsolescence; switching to molded knobs would require the scrapping of the entire plant equipment now used in making metal knobs, including thousands of dies. Obviously, this won't happen all at once.

THE EVOLUTION OF STYLE IN PLASTIC DRESSERWARE

(*Continued from page 17*) heavier sheet of another color. Some important combinations were ivory on amber and shell on amber. The effects obtained were distinctive but in the light of today's standards the combinations of that day were not always artistically good. With the advent of these material combinations a color vogue was started that will probably subside only when the ladies no longer need the aid and comfort of the brush, mirror and powder puff for their beauty makeup.

In 1924 there was a new and important development in the nitrocellulose plastic industry. A thin pearl-like material was developed, beautiful in design and in lustre and of a white translucency which delicately reflected any material placed under it. For example, a sheet of green under this pearl will produce a beautiful green tinted pearl. This new material was at first quite expensive being made out of a highly lustrous substance obtained from fish scales. It is interesting to note that for a while but one manufacturer had the temerity to use it on account of high cost. After ex-

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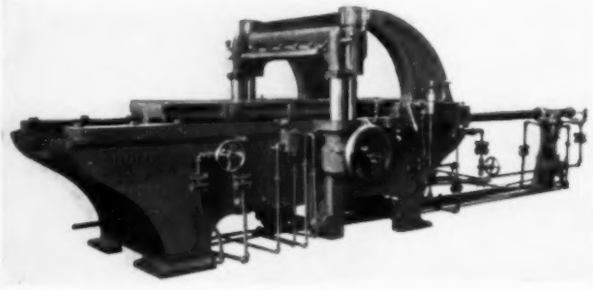

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tensive research, it was found possible to produce this material without fish scales by the substitution of mercurous chloride, and a substantial saving in cost resulted. The beauty of this new material took the market by storm and within a year practically all Pyroxylyn toiletware was being made of a composite of pearl on a sheet of color such as green, blue, pink or maize on a heavy base sheet of amber. This type of material in toilet sets attained a wide popularity over a period of years until the weight of newer developments thrust it into the background.

In succession came an array of delicate translucent plain colors and then translucents with beautiful and ingenious configurations all running to the varied colors of the rainbow. In 1928 there was again an outstanding development for Celluloid toilet sets. Brazilian onyx was duplicated. The first made was the rich green variety with its markings of "rust," its "fracture" lines, its translucency and speckled markings. To make this material new features in configuration had to be evolved. The resulting reproduction was so close as to make distinction a matter of very careful examination. This material in various colors and its derivations, the "Pierretone" materials of the present day, are no doubt among the finest reproductions of Nature's materials which we have.

The colors mentioned do not represent by any means all that have been used for toilet sets. Beautiful effects resembling rosewood, ebony and satinwood, composites employing silks and satins to give color to the Celluloid, and composites with veneers of real wood such as birds-eye maple, mahogany and walnut, have recently been produced for use in toilet sets and give further proof of the versatility of the basic material.

Long before industry in general recognized the value of good design, manufacturers of Celluloid toilet sets were looking for guidance for the contours of the articles, the decorations, the color combinations, to artist designers. The flexibility of the material used, the ease with which it lends itself to fabrication and the readiness with which it accepts gifts of the artist made it feasible continually to improve the beauty and artistry of the product.

The earliest sets had embossed designs on their surfaces. Then later when florid design passed on and simpler things became the vogue beautiful designs were engraved and painted to be followed later by inexpensive but effective decorations done with dies. And then sets were carved and they were studded with rhinestones and set with cabachones and mounted with miniatures. And today in consonance with the finest of industrial art we find toilet sets lacquered and gold decorated or inlaid with shimmering silver, or mounted with gold, silver and chrome plated ornaments. Handles are in clearest transparent, carved in lace-like tracery or in contrasting colors, trimmed with chromium, silver, gold and black nickel fittings. And all in the most glorious array of colors. In translucents and in transparents, in plain materials and in materials with marvelous configurations, in green, in blue, in

pink, in peach, in orchid, in jet and in ivory, too.

Celluloid toilet sets in the fifty odd years since they were first made developed increasing popularity year after year almost without a lapse. They were made and sold yearly in the tens of thousands. They became and are a most popular Christmas gift item. They are found in millions of homes. They are beautiful, require little care, comparatively inexpensive and are made of a material that is peculiarly fitting, lovely and practical.

FURNITURE IN THE MODERN MANNER

(*Continued from page 20*) mental part of the furniture, they will find great use. Here again, they first must demonstrate their especial fitness over the material they are to replace. They must prove themselves better for the purpose than other available materials, and easier to fabricate. Then the interest in their use will quicken into action.

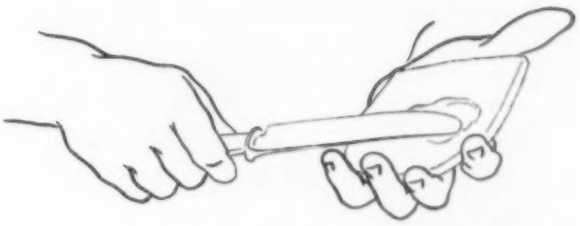
Mr. Deskey admits he has been somewhat prejudiced against plastics because of the stupid ways in which they have been used. The reproduction of Louis XVI marble candlesticks, for instance, with similated marble veins. Wood grains and other imitation finishes have hurt their acceptance as decorative materials. These uses must be lived down before people will come to look upon plastics as things of beauty in their own right rather than imitations of something else.

A well known manufacturer spent millions trying to sell metal furniture lithographed to imitate mahogany or oak. Unaccustomed to the advantages of metal for such use, the public looked at them, felt of them, and said, "Humph! Tin!" It has taken years to convince consumers that metal is not only stronger but actually lighter than woods of approaching strength, and will last years longer.

Aluminum chairs, because they are sturdier and lighter, have found general acceptance but it has taken a long time to bring about the conviction that this was true. Now they sell successfully in competition with wood chairs because their advantages have become known. People are used to seeing chairs and tables of aluminum construction. They are distinctive in design. They imitate nothing. And they are associated instinctively with quality merchandise.

On the other hand, during the past few years, some designers have made very intelligent use of molded plastics. Many of our clock cases and radios offer splendid examples of what can be done. Mr. Deskey has designed some fifty or sixty clock cases as well as lamp bases and lighting fixtures which demonstrate the feasibility of using plastics in mass production where mold costs may be spread over a period of time.

Perhaps the greatest public interest in Mr. Deskey's work centers in the interiors of the Music Hall at Radio City which he designed and where he made generous and effective use of plastics in lamps, table tops and



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smokers. Plastics were similarly used in his design of the Mayfair Bridge Club where the playing tables have plastic edges for permanence.

Another illustration shows intelligent use of prefabricated plastics for the wall of a print room in which the print rails are molded and no hardware required to hold them in place.

In spite of his admitted prejudice against plastics, he took me into his workshop where he keeps samples of every conceivable make of plastic material with which he is constantly experimenting. And he showed me the model of a forty room home now being built in which plastics will play an important part in the architecture as well as in the furnishings.

Mr. Deskey maintains an extensive showroom in New York where home furnishings of his design made by leading manufacturers are constantly displayed to architects, decorators and other wholesale buyers in search of modern design at moderate cost.

THE ARCHITECT DESIGNS HIS OWN HOME . . .

(*Continued from page 12*) to relieve them with olive greens and a few brilliant colors judiciously placed to add life and interest to the general appearance of the rooms, and to form a setting of simple dignity for upholstered pieces and those of rare woods and metals which will complete the ensemble.

The house will be air-conditioned throughout, assuring the proper temperature and humidity for healthful and comfortable living all the way around the calendar, and Mr. Sanders is hopeful of finding a source to supply plastic grills to cover the wall openings where hot and cold air enter and leave the rooms.

Plastics will greet the visitor at the front door which will be of old red phenol, with glass peep-hole, set in royal travatine. The façade, of royal blue glazed brick, will be broken at each floor by oblong panels of vacuum-glass brick which are but $2^{3}/_{4}$ in. thick, yet possess insulating value of an 8-in. brick wall with 1 in. of plaster, and allow light to penetrate deeply into the rooms without loss of heat. At the street and living room floors these panels are recessed five feet to form loggias, and at chamber floors the panels will be flush with the façade. White metal casement windows within the glass brick panels prevent any feeling of claustrophobia at chamber floors, and casement doors will give entry to living room loggias which will be shrubbed to advantage.

Plants will play an important role in the interiors, the glass brick being conducive to their growth by admitting an abundance of sunshine and light. Air-conditioning removes the necessity of opening windows for air and makes the house particularly free from the dirt and noise of the city. The studio will have direct entrance from the street floor loggia which has built-in spaces for plants and shrubs high enough to be out of reach of the most ambitious dogs.

CAST PHENOLICS—CORRECTIONS

In the article on Cast Phenolics—the Jewel-Like Plastics, page 46 of the November number of MODERN PLASTICS, the following table giving the physical properties of certain of the cast Bakelite resinoids was omitted because received too late for inclusion. It is presented here to supplement the information given in the original article. The table does not include data on the physical properties of all Bakelite cast resinoids; only those designated C-1 and C-25.

The C-1 resinoid is used for applications which require a hard, transparent, water-resistant material. It is available in a variety of cast shapes and has been employed extensively for such products as smokers' accessories, costume jewelry, such as beads and bracelets, and also for certain forms of chemical apparatus, especially graduates and burettes.

The C-25 resinoid is used where a tough, transparent light-resistant material is required. It is furnished only in plates having a maximum thickness of about one inch. It is superior to the C-1 resinoid in toughness and light resistance, but is inferior to it in water resistance. It has been employed very successfully in photo-electric equipment because of its advantageous properties. The same material is employed in the construction of gasoline gages.

PHYSICAL PROPERTIES OF TWO BAKELITE CAST RESINOIDS

Designation	*C-1*	*C-25*
Specific gravity	1.28	1.38
Refractive index	1.65	1.573
Water absorption, per cent		
1 x 1 x 1/8-in. sample, room temp. 3 mo.	1.1	1.5–2.0
60 deg C., 1 mo.	...	3.5
100 deg. C., 3.5 hr.	1.08	...
Impact strength, Izod, ft.-lb. per inch square determined on unnotched 1/2 x 1/4-in. bar	3–4	9–15
Tensile strength, lb. per sq. in.	5000–9500	10,600
Hardness, Brinell	30–35	25–30
Coefficient of expansion, deg. C.	70×10^{-6}	35×10^{-6}
Heat distortion, as measured by A. S. T. M. method D48-33	135 deg. C.	90 deg. C.
Dielectric strength, volts per mil by step test	400–500	400–500
Arc resistance	Poor	Excellent
Power factor, per cent		
audio frequencies	0.6	0.6
radio frequencies	1.0	1.0
Modulus of elasticity	320,000	...

(Above data are as furnished by the Bakelite Corp.)

An error occurred in the legend for the first illustration in the article in the November number, which indicated that all the photographs used were furnished by the American Catalin Corp. In reality, the Dwyer carbon-dioxide indicator, page 50, the costume jewelry, page 52 and the cutlery, page 53, are all cast Bakelite resinoid products and the photographs thereof were furnished by the Bakelite Corporation.

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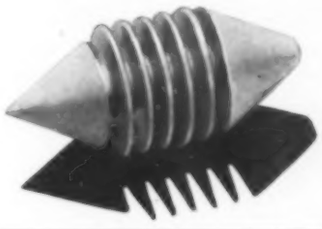

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